AMERICAN ARTISAN

APRIL
1941

RESIDENTIAL AIR CONDITIONING
WARM AIR HEATING • SHEET METAL CONTRACTING

ESTABLISHED
1880

CONFIDENTIAL

A Message to the Sheet Metal Man with a Problem

Machinery—Manpower—Money—our great national resources, must be expanded and used to their fullest. By no other means can we complete today's vast National Defense Housing Program on schedule. It's every man's problem—and a tough one, too! The Sheet Metal Contractor is no exception.

We all know the Problem—but what is the answer? Here is the answer for the Sheet Metal Contractor:

Use LAMNECK Prefabricated Duct and Fittings as an unlimited source of ready-to-install material. Don't limit your contracts to your own machinery and shop capacity. No Housing Project is too big for the contractor who uses Lamneck.

Use LAMNECK Prefabricated Duct and Fittings to multiply your present man power by directing all of your efforts to installation work. Release your shop men for an "all-out" of man power for the economic installation of more jobs.

Use LAMNECK Prefabricated Duct and Fittings to expand your capital to be able to take more contracts. Release your money that's tied up in your shop. Buy Lamneck fittings as and when you are ready to install them on the job. Turn your funds over faster by waiting to use them nearer the completion time.

Add to these features ***LAMNECK'S*** superior duct design by which installation time can be cut to the minimum. Pick up the phone and order all the fittings you need for today's installation from your nearest LAMNECK distributor.

Specify LAMNECK

LAMNECK PRODUCTS INC. Middletown, Ohi

Simplified Furnace Pipe and Fittings and Prefabricated Duct and Fittings for all Types of Residential Gravity and Forced Warm Air Heating and Air Conditioning Systems

See the NEW AUER HEAT-RITE

● IT'S A BEAUTIFUL REGISTER!

See It!—Inspect It!
Admire It!
It's the Gravity Register of the Year!

The Gravity Register that sets the style for 1941

Do you want smooth "air conditioning" beauty in a gravity register? Here it is—Auer's brand new baseboard design—a warm air register with an appearance as fine as any air conditioning model! Styled down to the minute by an expert industrial designer—modern, streamlined—the Heat-Rite is still so simple, so free from frills, that it is bound to wear well—in attractiveness as well as in service. Ideal for replacement purposes, where an existing gravity job is being remodeled for air conditioning.

Its close-set, slightly downward directional fins, improved lever knob, and graceful proportions make it highly in keeping with today's architectural trend. Abundant open area for all installations. Made in 2 piece or 1 piece models—all usual sizes and finishes. Also furnished for wall registers, and for baseboard cold air intakes. In addition to standard finishes, the Heat-Rite is now offered in Auer's new DuraTone lustrous metallic finish, at prices in line with usual finishes.

A request from you brings complete Auer Register Book, showing all types and designs for air conditioning and for warm air. Special Grille Catalog "G" also available.

The Auer Register Co., 3608 Payne Ave., Cleveland, Ohio

AUER REGISTERS
& GRILLES · For Air Conditioning *and* Gravity

AMERICAN ARTISAN

WITH WHICH ARE MERGED

FURNACES AND SHEET METALS

AND

Warm-Air Heating

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

J. D. Wilder, Editor — A. A. Kennedy, Assistant Editor

Vol. 110, No. 4 — April, 1941 — Founded 1880

CONTENTS

Honesty Needed in the Attic Fan Field 41
Sheet Metal Specialties Needed in Rearmament 42
America's Tax Burden 44
New York State's 18th Annual Convention 85
Pro-Rate Your Overhead to Find Profits 88
Michigan Proposes State Licensing for Heating 90
Association Activities 93
New Products 94
New Literature 101
With the Manufacturers 104
Obituaries 112
News Items 114

RESIDENTIAL AIR CONDITIONING SECTION

Cooling System for a Bowling Alley 47
Technical Code—Precalculated (Part 6) 48
Ventilation Now—Conditioning to Be Added Later 53
Neubecker Pattern for a 3-Piece Elbow 56
The Installation and Use of Attic Fans 58
Certified Quality—A Year of Progress (Part 3) 61
Air Avidity—A New Thought in Humidification (Part 2) 64

THE SHEET METAL SECTION

Material Collecting System in a Furniture Factory 69
Shop Fabricated Ornamental Marquee 73
Hot Dip Tinning of Milk and Ice Cream Cans (Part 1) 74
3-Oz. Copper Roof Laid with 190-Foot Strips 76
Fluxes for Soldering 78
Wheel-barrows and Other "Heavy" Specialties 80
Model Ships for a Fish Pool 82

In This Issue

THIS month's cover picture—a bowling alley—represents a field for cooling which the industry considers immediately active. A typical bowling alley cooling installation is described on page 47.

●

In recent weeks numerous letters have been received asking where and how sub-contracts may be obtained for the fabrication of sheet metal specialties used in rearmament. We asked Arnold Kruckman (see page 42) to inquire in Washington and the results of his questioning appear in his Washington Letter. If the suggestions sound vague in any particular—remember Washington is a mad house and almost no one knows what anyone else is doing.

●

Henry Aronson's Precalculated Technical Code series draws to a close with the article on page 48. A few supplementary tables with brief explanation remain to be published. The response to this very practical design method has not been as spontaneous as we had hoped but perhaps many readers are using Mr. Aronson's ideas, tables or parts of them without comment. We would appreciate letters from readers who have found these articles helpful.

●

On page 58 we publish part 1 of a series reprinted from Texas A. & M. bulletin 52 on attic fans. Much of the material is elementary, but most suitable to show to prospects. Some of the costs of installing and operating attic fans are brand new and will be of interest. Watch for following articles.

●

One of the largest material handling systems remodeled and modernized in the middle west is reported on page 69. Many of the details were especially devised for 1940 model wood working machinery.

Member of Audit Bureau of Circulations — Member Associated Business Papers, Inc.

Published monthly by Keeney Publishing Company, 6 North Michigan Ave., Chicago, Ill., U. S. A. Branch Offices—In New York, Room 1734, Grand Central Terminal Building, Murray Hill 9-8293; In Cleveland, 2128 Rossmoor Road, Cleveland Heights, Yellowstone 1540; In Los Angeles, J. H. Tinkham, 1406 S. Grand Ave., Richmond 6191.

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Yearly Subscription Price—U. S. and possessions, Canada, Mexico, South America, Central America, $2.00; Foreign, $4.00. Single copies, U. S. and possessions, $.25. Back numbers, $.50. January, 1941, Directory issue, $1.00 per copy. Entered as second-class matter, July 29, 1932, at the post office at Chicago, Illinois, under the act of March 3, 1879.

More than 8,000 copies of this issue are being distributed

"I'D SOONER GO AFTER THE TAME ONES!"

This sheet metal man is right... there's less sport but more dough in the aquarium variety

1 One thing fish in captivity need, same as those in the rivers an' ocean, is plenty of light. On account of which some contractor gets an order for no less than 45 skylights on the New York City Aquarium. These skylights have to stand up against the wind an' the weather . . . so every one is made of Monel. The cap strips are made of .025 inch Monel sheet, an' the frames of .021 inch roofing temper Monel sheet.

2 On a roofin' job, it pays to keep your eyes peeled for other items beside the old standbys. This pent house (or "cupola" the fish know it as) is all covered with Monel sidin'. Considerin' the amount of metal an' how easy you can handle Monel, there's a nice hunk of profit in this job.

3 Whether a roof keeps rain off fish or humans, gutters an' leaders for carryin' rain away ought to be built so they won't rust out. That means use Monel. Two more places for extra sheet metal gravy on this private house are wainscottin' an' the fancy "iron work"... both Monel.

Why are roofin' jobs in Monel a payin' proposition? Because Monel is easy to work an' solder, costs less to handle, gives you a bigger margin an' brings you satisfied customers.

Tim Shears

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N.Y.

MONCRIEF

A POWERFUL AGGREGATION OF PROFIT PRODUCERS FOR YOU

Just see all the Moncrief line gives you to do business with—

A line of furnaces and winter air conditioners that includes every type and style of unit you may need to meet any demand.

Every unit is packed with quality and improved design features, presenting selling points to meet and beat competition from every angle.

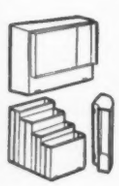
Every one styled up to the minute, radiating the eye appeal that excites interest and generates sales.

The Moncrief Proposition gives you everything you need to make money in 1941—the most advanced and complete line of furnaces and winter air conditioners—the Moncrief Financing Plan—Moncrief Engineering Service to help you estimate and plan—Moncrief Literature to help you sell.

Write for particulars.

No matter how choosey they are, there is a Moncrief unit that fits their needs exactly.

MONCRIEF PIPE and FITTINGS



If you want pipe and fittings that fit—that go together as they are supposed to go, present a neat appearance and give long time satisfactory service, take on Moncrief. Made in two types, specially designed either for gravity or air conditioning. Moncrief Patented Lock Joints make wall stacks, stack heads, foot pieces and trunk duct fittings more efficient, neater and easier to install.

Send for Our Free Big Pipe and Fittings Books.

Square Cased
Cast or Steel Furnace

Series S
Steel Furnace

Series C
Cast Furnace

MONCRIEF SUPPLIES EVERYTHING USED ON A WARM AIR HEATING AND AIR CONDITIONING JOB

Complete Line of Furnaces and Winter Air Conditioners

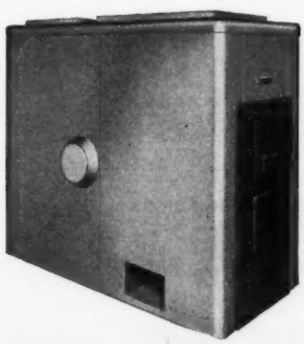
Aristocrat Oil-Fired
Winter Air Conditioner

Utility Oil-Fired
Winter Air Conditioner

Special Oil-Fired
Winter Air Conditioner

Moncrief Gas-Fired
Winter Air Conditioner

DST Stoker-Fired
Gravity Furnace



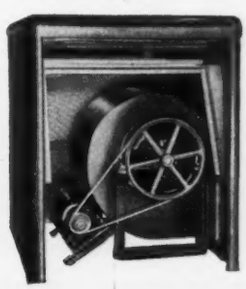
ST Stoker-Fired
Winter Air Conditioner

Aristocrat Cast Coal-Fired
Winter Air Conditioner

Aristocrat Steel Coal-Fired
Winter Air Conditioner

Series E
Steel Furnace

LongLife Furnace
Cast or Steel



Moncrief Blower-
Filter Unit

D-40 Steel
Furnace

DeLuxe LongLife
Cast or Steel

THE HENRY FURNACE & FOUNDRY CO.

3473 E. 49th STREET, CLEVELAND, OHIO

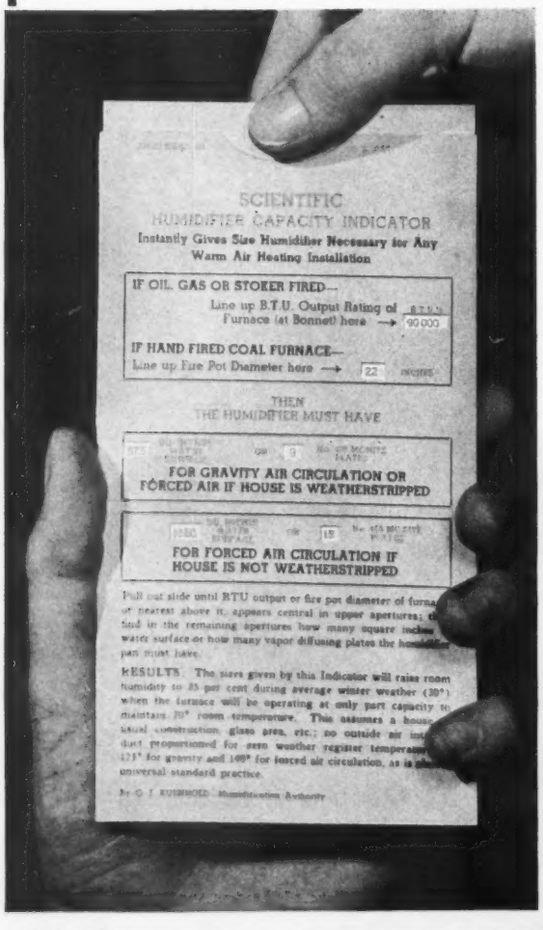
Now You Can Stop Kidding Yourself!

It is common knowledge that up until recently there has been no reliable method of estimating the humidification requirements of a given job. But it didn't make much difference because most humidifiers could not have delivered the needed capacity anyway.

Today things are different. Thanks to the new Monmouth Capacity Finder —given away free—you can tell **quickly** and **exactly** how much humidification is needed on **any** job. And thanks to Monite Vapor Diffusing Plates any furnace regardless of smallness of the plenum **can deliver that humidification.**

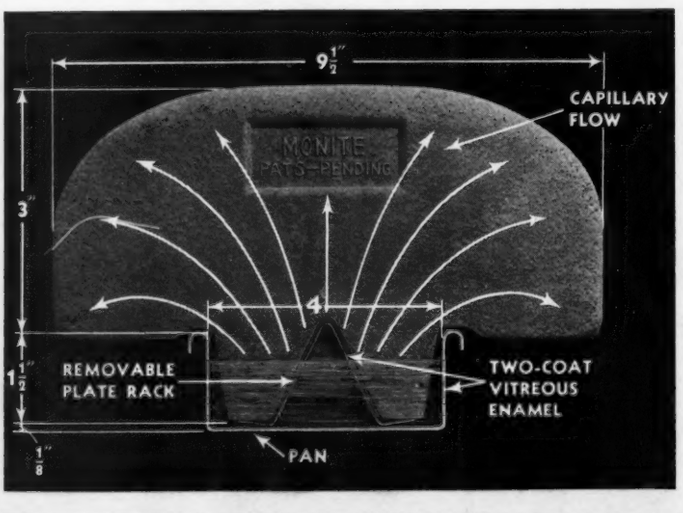
Each Monite Plate equals 70 sq. ins. of water surface. The pan capacity can be increased 17½ times if necessary just by adding plates. And Monmouth's complete line of scientific controls offers you a complete humidifier at every price level.

If you have not already sent for your free Capacity Indicator write us today on your business letterhead.


SCIENTIFIC
HUMIDIFIER CAPACITY INDICATOR
Instantly Gives Size Humidifier Necessary for Any Warm Air Heating Installation
IF OIL, GAS OR STOKER FIRED—
Line up B.T.U. Output Rating of Furnace (at Bonnet) here →
90 000
IF HAND FIRED COAL FURNACE—
Line up Fire Pot Diameter here →
22
THEN
THE HUMIDIFIER MUST HAVE
FOR GRAVITY AIR CIRCULATION OR FORCED AIR IF HOUSE IS WEATHERSTRIPPED
FOR FORCED AIR CIRCULATION IF HOUSE IS NOT WEATHERSTRIPPED

MONMOUTH PRODUCTS CO.

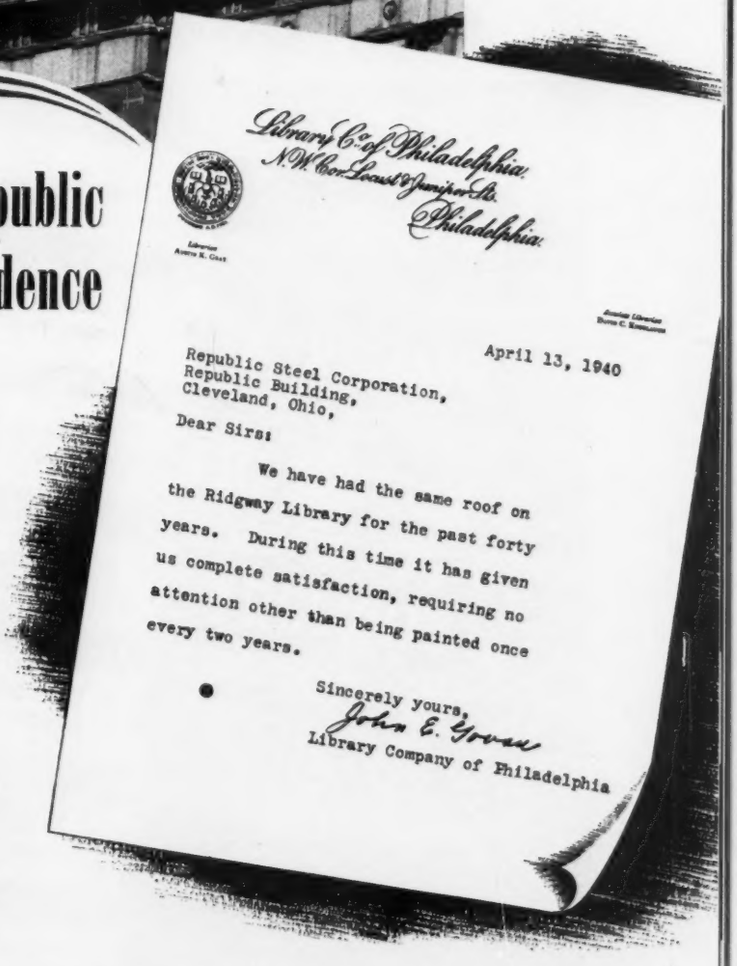
1933 E. 61st St. **Cleveland, Ohio**



MONMOUTH

The Greatest Name in Humidification

YOU can recommend Republic Taylor Roofing Ternes with confidence



Library Co. of Philadelphia
N.W. Cor. Locust & Juniper Sts.
Philadelphia

April 13, 1940

Republic Steel Corporation,
Republic Building,
Cleveland, Ohio,

Dear Sirs:

We have had the same roof on the Ridgway Library for the past forty years. During this time it has given us complete satisfaction, requiring no attention other than being painted once every two years.

Sincerely yours,
John E. Gorman
Library Company of Philadelphia

Having faith in the product you are selling goes a long way toward clinching a sale.

Here you see a Taylor Ternes roof, a veteran of 40 years, that proves the long-lasting weather-resisting qualities of this time-tested material — a copper-bearing steel coated with a lead-tin alloy. But — read the letter.

Taylor Ternes have provided extra protection to both large and small structures since 1810 — are well known to architects and contractors — provide an opportunity for you to get in on more profitable business.

Available in sheets and rolls and with various weights of coating, including that best of all known brands — Target and Arrow.

YOU CAN GET MORE ROOFING WORK — of the kind that both builds good-will and shows a profit. Write for Booklet 403.

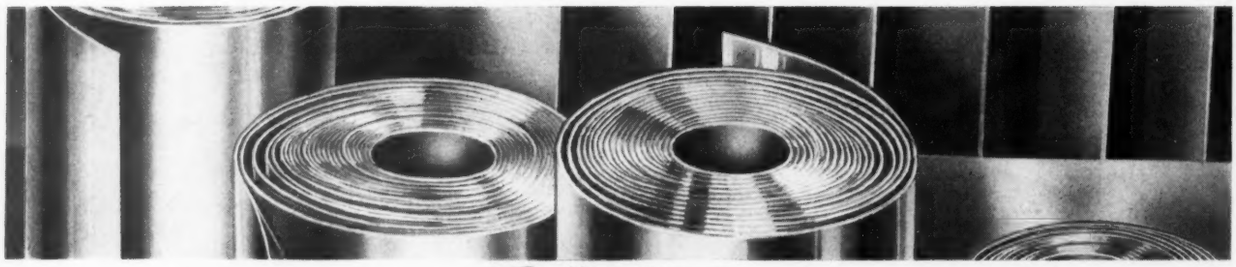
REPUBLIC STEEL CORPORATION
General Offices; Cleveland, Ohio

BERGER MANUFACTURING DIVISION • CULVERT DIVISION • NILES STEEL PRODUCTS DIVISION
STEEL AND TUBES DIVISION • UNION DRAWN STEEL DIVISION • TRUSCON STEEL COMPANY

REPUBLIC STEEL
DEFENSE FOR AMERICA

REPUBLIC TAYLOR ROOFING TERNES

FLAT SHEETS — PAINTED OR UNPAINTED ROLLS — SIX WEIGHTS OF COATING TO SELECT FROM — AND TARGET AND ARROW BRAND



You can SAVE production operations with HUSSEY COPPER!

HERE'S HOW...

UNIFORMITY — Always the same top quality—works easily, constantly.

WORKABILITY — A correct grade to do every job best—easy to process—easy to work.

MACHINABILITY — Machines cleanly—easily—to close tolerances—fine finishes.

WELDABILITY — Correct grades exactly suited to every copper welding application.

DUCTILITY — Strength with toughness in correct degrees for every copper need.

HARDNESS — When copper must be hard, too—look to Hussey for *your* copper needs.

STRENGTH — When tensiles must be accurate, there's a correct Hussey Copper for your job.

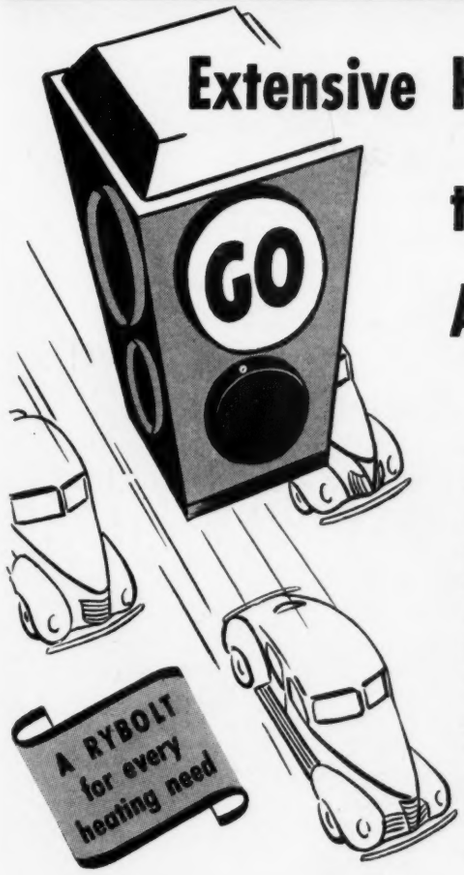
TECHNICAL ASSISTANCE — Let Hussey help you solve the copper working problems in *your* shop.

COPPER HUSSEY BRASS

C. G. HUSSEY & COMPANY
(Division of Copper Range Company)
Rolling Mills and General Offices: PITTSBURGH, PA.
Warehouses in Principal Cities

Quick delivery speeds Hussey Copper to you in money-saving time from seven complete warehouse stocks.

RYBOLT



Extensive Home Building Program Gives the *Go Signal* to AUTOMATIC HEATING SALES

• This year's huge home building program, which exceeds even the peak year of 1928, gives the "Go Signal" to vastly increased sales of automatic heating equipment. This sales drive will be bigger than ever before because modern automatic winter air conditioners are now so reasonable in price and so simple to install that they are well within the reach of the low cost home budget. Besides, through long term mortgages available today such equipment can be bought on remarkably easy terms.

The RYBOLT complete line gives the dealer an exceptional opportunity to cash in on this substantial upsurge of business. There's a RYBOLT automatic unit for every home heating requirement and for every fuel—coal, gas or oil. Efficient, convenient, dependable and economical they represent quality that insures complete and lasting customer satisfaction.

A RYBOLT QUALITY AUTOMATIC UNIT AT A REASONABLE PRICE

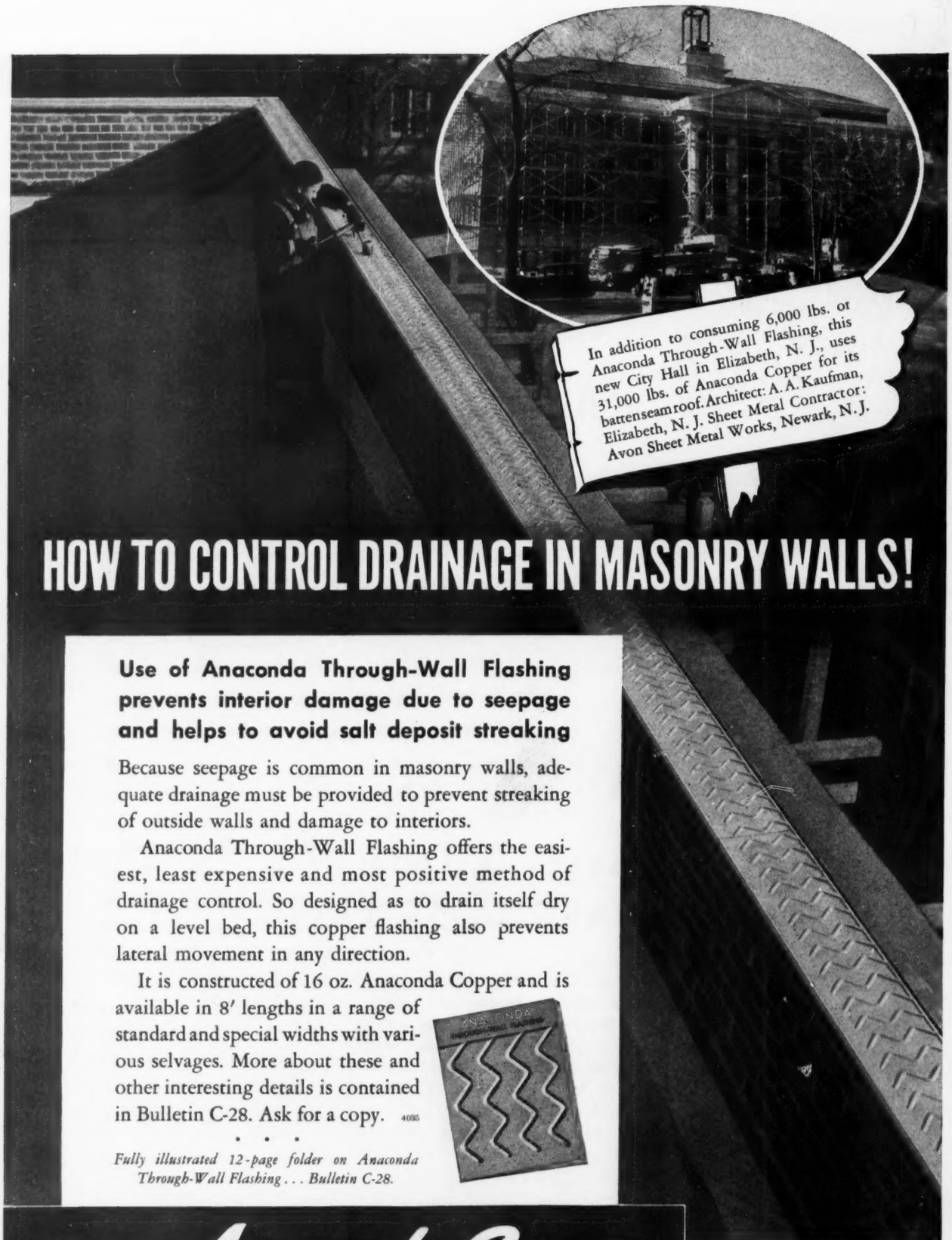
This unit has for its heating element the well known RYBOLT Series 15 Cast Iron Coal-Fired Furnace. Fully equipped with advanced modern features this unit delivers automatic winter air conditioning at its best. Blower cabinet may be placed on either side of unit. Regular equipment includes furnace and casing, blower and cabinet, blower switch, variable speed drive motor, humidifier and air filters. Cabinet finished in smooth baked enamel with aluminum finished front. An attractive unit that will harmonize with any basement recreation room decorative treatment.

SERIES 157 Cast Iron Coal-Fired RYBOLT Winter Air Conditioner

TRADE MARK

WRITE FOR *Folders describing and illustrating the Complete RYBOLT line of Winter Air Conditioners and Furnaces*

THE RYBOLT HEATER COMPANY
615 MILLER STREET • ASHLAND, OHIO


In addition to consuming 6,000 lbs. of Anaconda Through-Wall Flashing, this new City Hall in Elizabeth, N. J., uses 31,000 lbs. of Anaconda Copper for its batten seam roof. Architect: A. A. Kaufman, Elizabeth, N. J. Sheet Metal Contractor: Avon Sheet Metal Works, Newark, N. J.

HOW TO CONTROL DRAINAGE IN MASONRY WALLS!

Use of Anaconda Through-Wall Flashing prevents interior damage due to seepage and helps to avoid salt deposit streaking

Because seepage is common in masonry walls, adequate drainage must be provided to prevent streaking of outside walls and damage to interiors.

Anaconda Through-Wall Flashing offers the easiest, least expensive and most positive method of drainage control. So designed as to drain itself dry on a level bed, this copper flashing also prevents lateral movement in any direction.

It is constructed of 16 oz. Anaconda Copper and is available in 8′ lengths in a range of standard and special widths with various selvages. More about these and other interesting details is contained in Bulletin C-28. Ask for a copy. 4095

• • •

Fully illustrated 12-page folder on Anaconda Through-Wall Flashing . . . Bulletin C-28.

ANACONDA from mine to consumer

Anaconda Copper

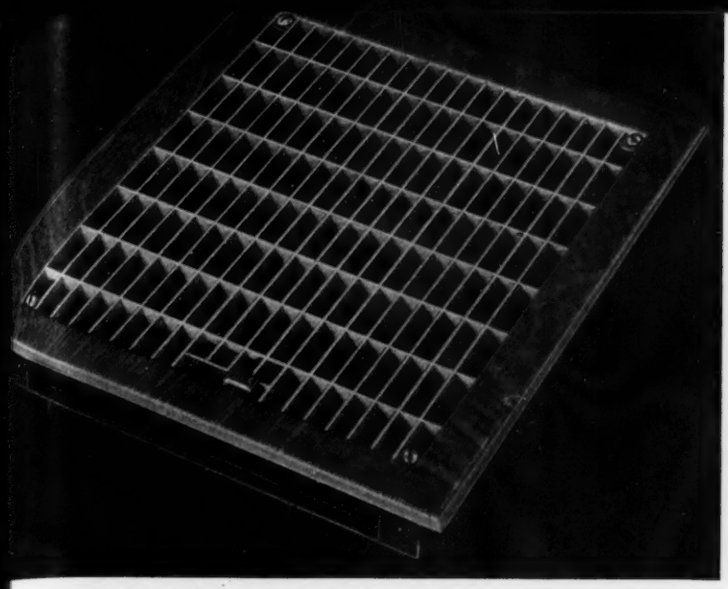
THE AMERICAN BRASS COMPANY, General Offices: Waterbury, Conn.

In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

Subsidiary of Anaconda Copper Mining Company

Reminder to Contractors

On most residential jobs, and on much commercial work, there is an opportunity for you to sell sheet copper for hoods and canopies over dormers, entrances and display windows. There's no harm in trying!



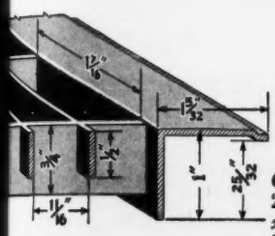
o. 210 FLOOR REGISTER—Standard mesh 7/16" x 1-7/16"

H&C NO-FLEX

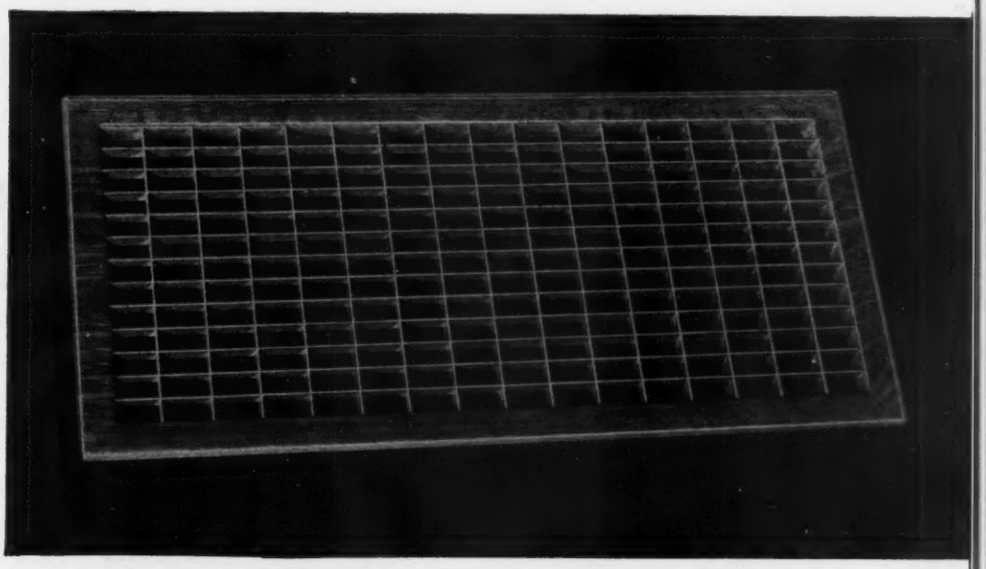
Registers and Return Air Faces

WILL WIN FRIENDS for YOU

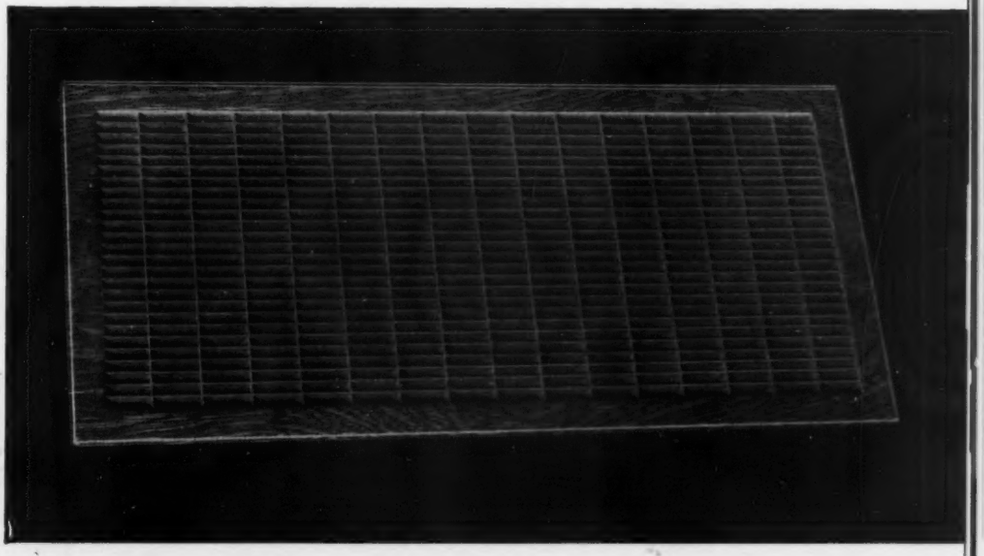
Better registers make better impressions on your customers. It pays to use the best! Particularly, when, as in this case, they cost you nothing extra. Try H&C "NO-FLEX" items on your next job and you will always use them!



Cross section of No. 265 in 4"-18" widths x 4"-60" lengths. Larger sizes are made with deeper braces for greater rigidity.



No. 265 RETURN AIR FACE—Standard mesh 11/16" x 1-7/16"

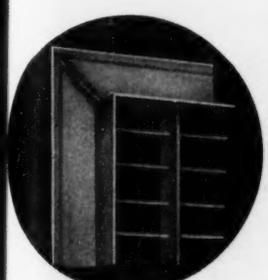


No. 266 RETURN AIR FACE—Standard mesh 5/16" x 1-7/16"

H & C "NO-FLEX" Registers and Return Air Faces are exceptionally strong and rigid due to the fact that the cross members are welded to each other and to the frame at frequent intervals.

Cross members have squared edges for improved walking surface and better appearance. ALL ITEMS IN THIS SERIES HAVE UNUSUALLY LARGE AIR CAPACITY.

Top-notch workmanship with careful attention to each and every detail, and finishes of lasting attractiveness assure maximum satisfaction. Your customers will appreciate the superior quality of these deservedly popular items.



Illustrating the manner in which corner joints are welded on underside.

Current Catalogs: No. 41 (Gravity Registers) and No. 41AC (Air Conditioning Registers). If not on hand write us.

HART & COOLEY MANUFACTURING CO.

Warm Air Registers • Air Conditioning Grilles • Damper Regulator Sets • Dampers • Chain • Pulleys

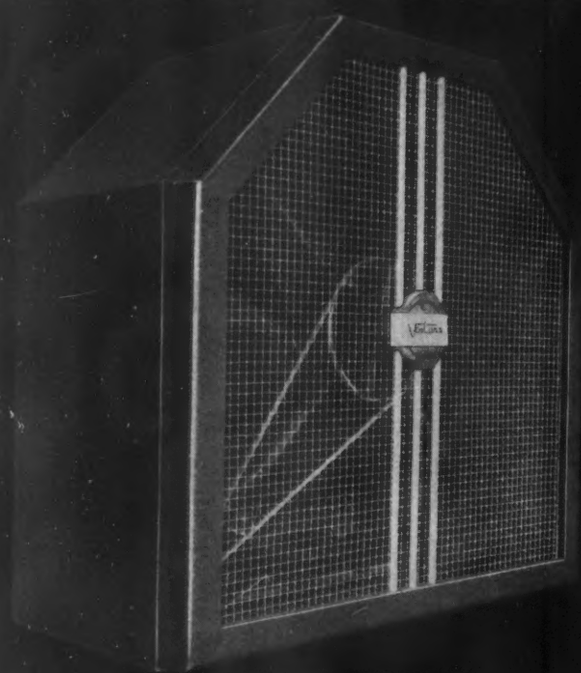
HOLLAND H&C MICHIGAN

Chicago Office: 61 W. Kinzie St. Philadelphia Office: 1600 Arch St.

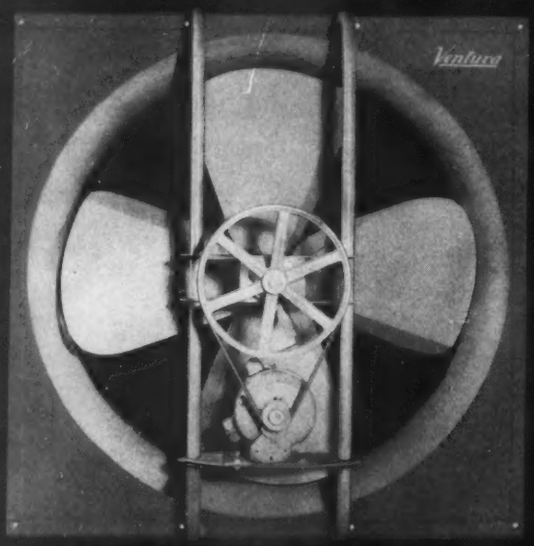
Western Representatives: John T. Rowntree Co., Los Angeles, San Francisco, Portland, Seattle, Salt Lake City, Denver

The PROFITS in Comfort Cooling will

POP



Famous Ventura Home Conditioner (Attic Fan), above. Thousands are now in use.



Above—the new, high quality, economically priced Ventura Attic Fan—greatest value in American Blower history.

Are you making money?

With your present business, even if you work your head off, can you make anything more than just a living?

Have you investigated the profit possibilities in Comfort Cooling with American Blower equipment?

The American Blower line is the most complete in the industry. It enables a dealer to sell homes, factories, commercial establishments, restaurants, offices, etc., products that they need and want.

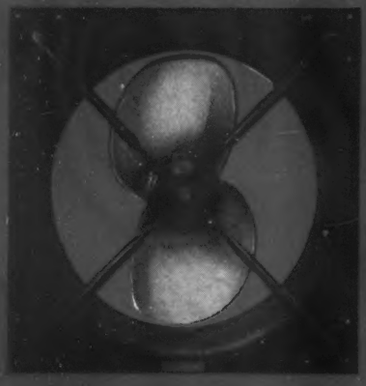
There are no trade-ins or complicated service problems to cut into your profits. It's a clean business, a real business, for real business men.

If you want to build for the future, if you want to insure your profits next year, the year after, and for as many years as you care to be in business, let us give you the facts on what can be done. Let us show you what dealers have made and are making selling American Blower equipment. Write today. There is no obligation. This may be the biggest opportunity in your life. The profit possibilities of this line will pop your hat off.

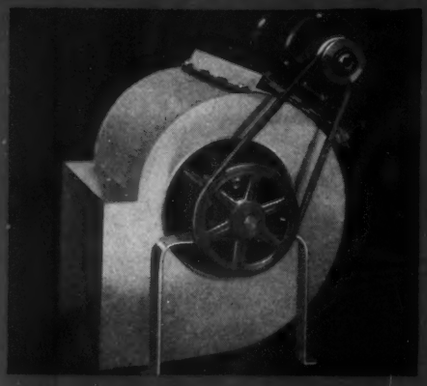
AMERICAN BLOWER

AMERICAN BLOWER CORP., 6006 RUSSELL ST., DETROIT, MICH.
Division of American Radiator and Standard Sanitary Corporation
In Canada: CANADIAN SIROCCO CO., LTD., Windsor, Ont.

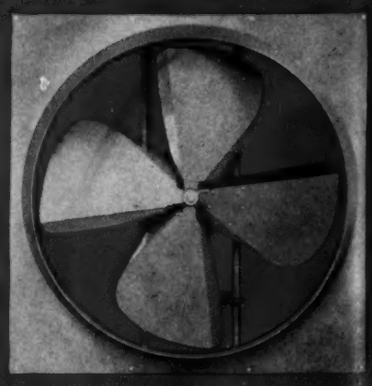
You can sell American Blower Products on F.H.A. Pay-By-The-Month Plan through The Heating & Plumbing Finance Corporation



Ventura Fan, direct connected, for industrial and commercial use.

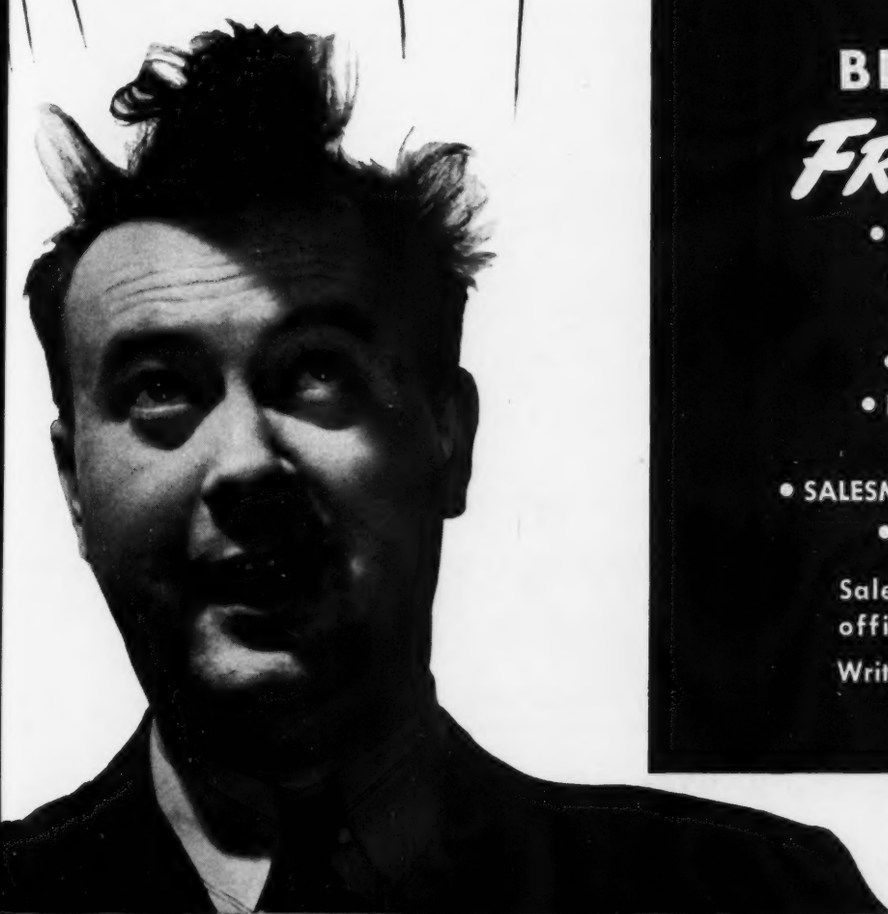


The AC Fan, for air conditioning work and fresh air supply.



Commercial Ventura Fan, V-Belt Drive, for industrial and commercial use.

YOUR HAT OFF!



BIGGER—BETTER *FREE PROMOTION!*

- COLORFUL SALES VISUALIZER
- NEWSPAPER ADVERTISING
- MAGAZINE ADVERTISING
- DIRECT MAIL ADVERTISING
- NEWSPAPER AD MAT SERVICE
- ARCHITECTS' CATALOGS
- SALESMEN'S CATALOGS AND PRICE BOOKS
- AUTHORIZED DEALER SIGNS

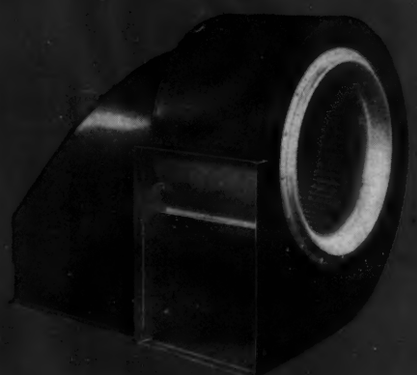
Sales assistance through 58 branch offices located in principal cities.

Write for copy of our sales plans NOW!

American Blower's reputation for high quality is backed by over 60 years' experience building all types of ventilating, heating, air conditioning and allied equipment. Over 58 branch offices in principal cities.

MECH. DRAFT · AIR-CONDITIONING · AMERICAN BLOWER · FLUID DRIVES · DUST COLLECTORS

Aerapel reversible electric ventilator, fits into a window.



ABC Utility Set, a complete, packaged unit for use with ducts.

NOW—TODAY! . . . Line yourself up with the greatest, most complete line of Comfort Cooling and Electric Ventilation products ever offered by American Blower . . . All top quality products, nationally advertised, nationally known. Any aggressive, intelligent concern can organize for year-round, successful sales and service of this complete line for homes, stores and industries within a few weeks. But the peak season is not far off! Act now!

YES—WE KNOW THAT NAME!

THE GREATEST Sunbeam sales records in history prove this fact: Prospects are quick to recognize, and *approve* Heating and Winter Air Conditioning products that bear the name Sunbeam!

To increase your sales and profits sell this famous, *complete* line that includes new and improved Warm-Air Furnaces and Winter Air Conditioners for all fuels —Coal—stoker or hand-fired—Oil or Gas—for all homes, large or small.

And enjoy these added advantages too: Conveniently located Jobbers' warehouse stocks—Powerful national advertising—Beautiful, striking new promotion pieces and literature—And a sales stimulating Summer Finance Plan that requires no down payment, no payments till October 7th, then up to 3 years to pay —gives you cash on installation! Write today for full information and the name of the Sunbeam Distributor nearest you!

And that's what most prospects say when you sell

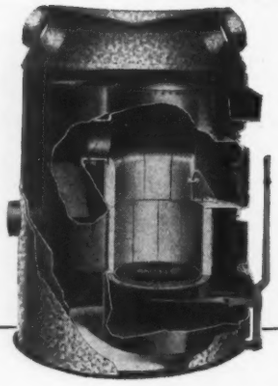
SUNBEAM

WARM-AIR FURNACES AND WINTER AIR CONDITIONING UNITS

AMERICAN HEATING EQUIPMENT COSTS NO MORE THAN OTHERS

THE NEW SUNBEAM SERIES No. D-500 STEEL FURNACE

Has larger, more massive Radiator, new Duplex Grate, Special Clinker Disposal Pouch, Higher Ratings and many other advantages.

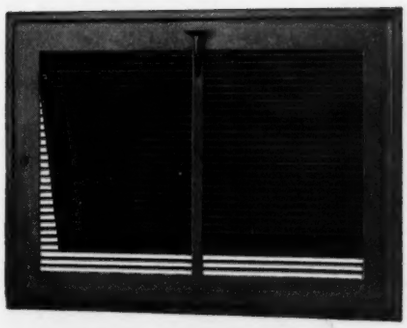


Made by

AMERICAN RADIATOR & Standard Sanitary

New York CORPORATION *Pittsburgh*

Copyright 1941, American Radiator & Standard Sanitary Corporation



New 240 Side Wall Register

The U.S. Winning Team

New 40 Series
GRAVITY BASEBOARD REGISTER

Beauty

WITH EFFICIENCY and ECONOMY

Now gravity installations can have all the smartness of modern air-conditioning register design with the new U. S. 40 Series Gravity Baseboard Registers.

No. 40 has the MAXIMUM FREE AREA with less resistance . . . NON-VISION . . . METAL-LAC FINISH (a soft brownish antique brass finish at Black Japan list) . . . TWO-PIECE CONSTRUCTION with Patented Grille attachment to frame . . . LEAK-PROOF . . . ADJUSTABLE GRILLE BARS. It fits Standard Gravity Register Heads so that CONVERSION installations may be completed by an exchange of Registers that necessitates no redecorating or other unnecessary expense.

The No. 240 U. S. Sidewall Register is designed for above-baseboard installation and matches No. 40 Series perfectly.

4-Way Flow A-C FLEX-BAR REGISTER

Style No. 256 FLEX-BAR Register

Style 256 is the Full-Face Coverage — Low Resistance A-C Register. Multiple valves give any degree Up or Down Flow. Flex-Bars set easily for direction of side flows.

Send for New 41AC AIR-CONDITIONING CATALOG

UNITED STATES REGISTER CO.

BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY • SAN FRANCISCO • NEW YORK, N. Y.

CANADIAN MANUFACTURING DISTRIBUTORS—Canada Register & Grille Co., Ltd., Toronto, Ontario

. . . resistance to corrosion . . . easy workability . . . two outstanding qualities of WEIRCOLOY COPPER BEARING GALVANIZED SHEETS

The sheet metal trade has been quick to recognize the outstanding qualities of this Weirton product. Weircoloy Copper Bearing Galvanized Sheets are uniform in gage and finish, have resistance to corrosion and are easily formed into finished products that give longer service life and gain added customer satisfaction for you.

When you have a sheet metal job calling for the best in all-round performance, specify and get this superior Weirton product—WEIRCOLOY Copper Bearing Galvanized Sheets.

LIST OF PRODUCTS

Bars . . . Angles . . . Structurals . . . Piling . . . Hot and Cold Rolled Strip . . . Hot and Cold Rolled Sheets . . . Galvanized Sheets . . . Long Terne Sheets . . . WEIRITE Cold Reduced Tin Plate . . . Terne Plate —Special Coated and Roofing Ternes . . . Tin Mill Black Plate . . . Lacqured Tin Plate and Black Plate.

WEIRTON STEEL COMPANY—WEIRTON, WEST VIRGINIA

Sales Offices in Principal Cities

division of NATIONAL STEEL

NATIONAL STEEL CORPORATION

Executive Offices, Pittsburgh, Pa.

CASH IN! WHILE THIS IS FRONT-PAGE NEWS!

Peerless Airboy

A 3-Speed, Direct-Drive Blower at Less Than Price of Single-Speed Types

$38.00 Dealer's net price F. O. B. Warren, Ohio

Attractive in appearance, the AIRBOY fits in well with the surroundings of any basement.

Large access door facilitates filter renewal and annual motor lubrication.

Note the compactness of the direct-driven blower unit of the AIRBOY. The two motor bearings are the *only* bearings in the unit.

SELLING the Peerless AIRBOY will enable you to *offer prospects more for less.* Your customers will get a *real* automatic winter heating system that will still be *modern* years from now. Each customer will be a rooter for you. More and more business will come your way.

Just look at this summary of Peerless AIRBOY features! Each feature will help you close a sale.

- **3-Speed Motor** of well known Peerless quality design.
- **Direct-Driven Blower.** No belts, no pulleys.
- **4 to 5 Room Capacity.** Blower delivers 850 cubic feet of air per minute—sufficient for house of approximately 10,000 cubic feet.
- **Single Large Filter** set in dust-proof filter frame.
- **Quiet—Minimum Vibration.** No metal-to-metal contact in blower units. Blower of low-speed, high-pressure type. Blower wheel dynamically and statically balanced. Motor-blower unit rubber cushioned. No belts to loosen and slap.
- **Minimum Attention Required.** Bearings—just two—require lubrication only once a year. Large access door facilitates lubrication and filter replacement.
- **Compact.** Direct drive makes possible a very compact unit. Will go through any doorway.
- **Shipped Assembled** ready to connect.
- **Attractive Appearance.** Casing of heavy-gauge steel with *rounded* corners. Green hammerloid finish. Chromium hardware.

Automatic and Manual Control Devices Available, at Extra Cost, as follows:

- **Two-Speed Automatic Control** changes air volume automatically with varying temperature conditions. $8.50 each, dealer's net, F. O. B. Warren, Ohio.

  Permits selection of speeds to meet varying weather conditions and temperatures.
- **Three-Speed Manual Control** by means of snap switch. This switch can be located anywhere in the house. High speed may be used for summer cooling. $1.35 each, dealer's net, F. O. B. Warren, Ohio.

Cash in on this opportunity while it's still front-page news! Be the first in your community to offer the Peerless AIRBOY *3-Speed Blower* at *less* than the price of most single-speed types. It means quicker, bigger profits for you—better satisfied customers—word-of-mouth advertising—a constantly increasing business.

Write for complete details. Biggest profits come to him who first offers more for less. Just fill in the coupon. Do it now!

THE Peerless ELECTRIC CO.
WARREN, OHIO

THE PEERLESS ELECTRIC CO., Warren, Ohio

☐ Enter my order for——AIRBOYS and——3-speed manual-control snap switches or——automatic controls.

☐ Rush complete information to me on the new Peerless AIRBOY.

Name _____ Title _____

Firm _____

Address _____

City _____ State _____

More Business . . More Profit with these Osborn Products

Every day in many a shop, office, restaurant or farm building, the air becomes so foul and stuffy that it is impossible to keep wide-awake. Men who work under such a handicap for any length of time are easy to sell on the idea of installing ventilators.

The next few months will be the best of the year to sell ventilation. Choose a good ventilator—one you know is right—and push it. As a suggestion, buy a small "GLOBE" from your local sheet metal distributor and show it to your prospects. And, while you are explaining its construction, don't forget to mention that "GLOBE" efficiency has invariably proved itself in every kind of service for more than half a century.

THE J. M. & L. A.
OSBORN Co
CLEVELAND, OHIO
BUFFALO • CINCINNATI • DETROIT
Manufacturers—Distributors of Metals and Metal Products

TYPE "A" VENTS

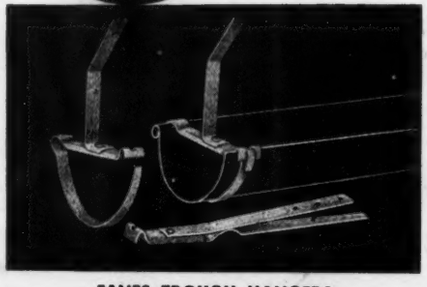
Prevent down drafts on gas flues. Scientifically designed; the efficiency of the Type "A" has been proved under the most severe operating conditions.

BACK DRAFT HOODS

For use on gas appliances to prevent accidents.

ROOFING CLIPS

Made from 1/8" x 5/8" half ovals and cadmium plated. Fit any standard section used for purlins.



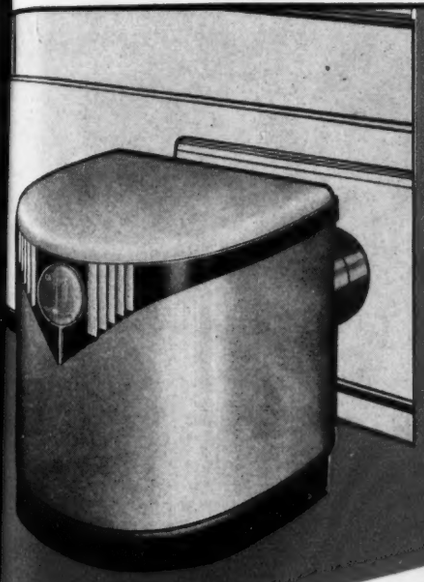
EAVES TROUGH HANGERS

"Golden Star" single bead hangers are fast and easy to install. They fit all makes of trough and cost little more than wire hangers.

A DEPENDABLE SOURCE OF SUPPLY FOR 82 YEARS

"Greatest PROFIT POSSIBILITIES In the Warm Air Field"—Say Dealers Everywhere

Send for Facts on most sensational line Winter Air Conditioners on the market—



Oil-O-Matic burner with Acousti-Case.

Startled auditors rubbed their eyes . . . doubting executives questioned the figures and ordered a recheck. "Yes," came back the emphatic report, "those facts stand."

Never before had Oil-O-Matic enjoyed as big a volume of business as in the first 2½ months of 1941. An unprecedented number of burners, boilers, furnaces and water heaters had been ordered, from Washington to Minnesota to Florida and to Maine. Never had there been such an instant response from dealers as now! There can be only one answer:

Low price Williams Hi-Pressure conversion oil burners — capacities from 1 gallon to 7 gallons of oil an hour.

Yes! OIL-O-MATIC has it!

Oil-O-Matic Has the Line . . .

Whatever you need to meet automatic heating needs in your market—Oil-O-Matic has it! BOTH Oil-O-Matic low pressure and Williams Hi-Pressure oil burners and oil fired winter air conditioners. Steam and hot water boiler-burner units. And a sensationally economical fuel oil burning water heater. Models, capacities, prices for COMPLETE market coverage.

Oil-O-Matic Has the "Acousti-Case"

The greatest oil burner development in ten years! That's what dealers and public alike call the sensational Oil-O-Matic "Acousti-Case." Like every Oil-O-Matic feature it's designed to help you sell. It adds superb streamlined beauty—it hushes—it protects. Standard on Oil-O-Matic models K-150, K-3, and K-45. Pictured above.

Oil-O-Matic Has the Name . . .

And back of the Oil-O-Matic name is a hard-hitting merchandising record, unmatched in the oil burner field. Millions of dollars in advertising have made Oil-O-Matic a world-wide synonym for economical, long-lived Oil-O-Matic oil heating. And Oil-O-Matic's more than a quarter of a million installations outnumber those of any other oil burner by far.

Oil-O-Matic Has the Sales Tools

Product quality and performance are only part of the Oil-O-Matic story. Because Oil-O-Matic has what it takes to HELP YOU SELL. New literature . . . new display material . . . new newspaper ads written from the dealer's viewpoint . . . highlighted by a Retail Sales Plan that is being talked about from coast to coast.

SEND FOR COMPLETE DETAILS

It's easier to sell the line that's complete! The greater '41 Oil-O-Matic line includes—left: Hi-Boy Winter Air Conditioner—100,000 B. T. U.'s at bonnet; above — Gravity furnace-burner unit — 85,000 B. T. U.'s at bonnet.

The Oil-O-Matic Winter Air Conditioner shown to the left is built in four popular sizes —famous for operating efficiency and economy.

Get the facts about OIL-O-MATIC '41! A NEW Retail Sales Plan! NEW *Selling* literature! NEW Theme! NEW Approach! NEW Profit Possibilities!

MAIL COUPON TODAY

Mail Facts *on the Williams Oil-O-Matic Warm Air Profit line—*

Williams Oil-O-Matic, Dept. A4—
Bloomington, Ill.

Name .....

Address .....

City ..... State.....

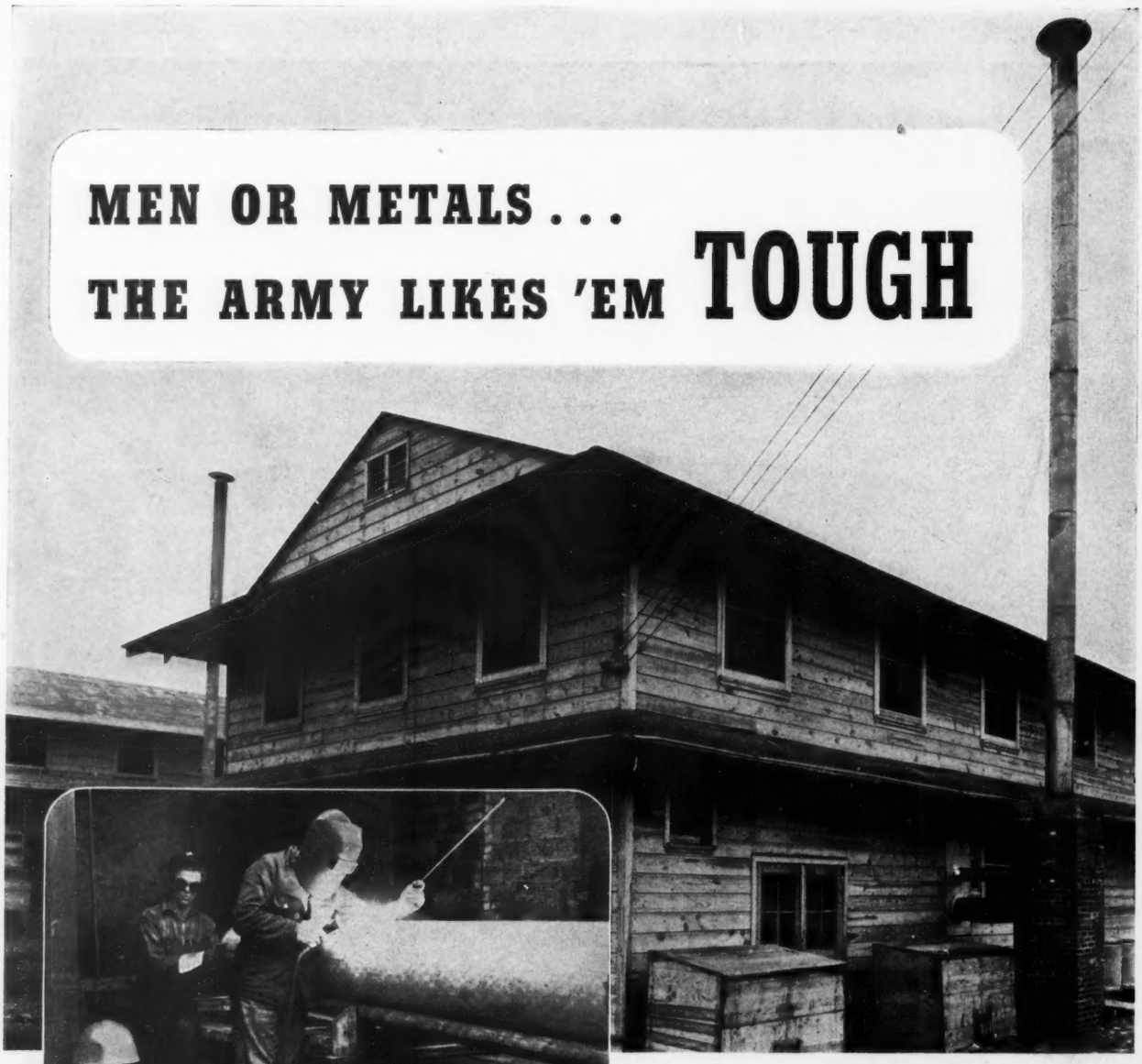
By whom .....

Include information about OIL-O-MATIC
☐ Water Heaters ☐ Furnace-burner units

WILLIAMS OIL-O-MATIC HEATING

WILLIAMS OIL-O-MATIC HEATING CORPORATION
BLOOMINGTON . . . ILLINOIS

MEN OR METALS . . .
THE ARMY LIKES 'EM TOUGH



ABOVE: More than 350 tons of galvanized ARMCO Ingot Iron was used for stacks and ventilators at Fort Custer, Michigan. The Glendon A. Richards Co., Grand Rapids, was the fabricator.

LEFT: The ductility and excellent welding properties of galvanized ARMCO Ingot Iron enabled workmen to fabricate these 14-gage, 42-foot stacks with production-line speed and efficiency.

• The Army is no place for weaklings. Men or metals must be "able bodied." That's why galvanized Armco Ingot Iron is getting the call for many of the government's new cantonments. It is a durable veteran that has earned its reputation by years of faithful service on many kinds of tough jobs.

At Fort Custer, Michigan, more than 350 tons of this highly-refined iron was recently used for smoke-stacks, ventilators and other construction. The 14-gage stacks were rolled and butt welded into 42-foot cylinders and erected by traveling cranes.

The easy working and welding properties of galvanized Armco Ingot Iron enabled contractors to maintain abnormally fast production schedules. And its resistance to the products of fuel combustion, high temperatures and atmospheric corrosion give ample assurance of long, economical service.

Use galvanized Armco Ingot Iron wherever an easy-working, extra-durable metal is needed. It will help you do faster, better work and make more money. And remember galvanized Armco Paintgrip when the work is to be painted. For prices and other information, call the nearby Armco Distributor. The American Rolling Mill Co., 1311 Curtis St., Middletown, O.

Galvanized ARMCO INGOT IRON

FREE service can be a millstone around your neck. But when you use Minneapolis-Honeywell Controls you reduce control service calls to the absolute minimum.

• A five year M-H service record study shows that repair costs due to factory defects amounted to less than ½ cent each for each device shipped. This remarkable record covers hundreds of thousands of instruments of various types and reflects a true picture of service rendered by Minneapolis-Honeywell Controls.

• Surely Minneapolis-Honeywell Controls make free service as light a load as possible . . . Minneapolis-Honeywell Regulator Company, 2726 Fourth Avenue S., Minneapolis, Minn. Canadian Plant: Toronto. European Plant: London. Company owned branches in 49 cities.

This thing can be heavy

KEEP IT LIGHT!

STANDARDIZE ON MINNEAPOLIS-HONEYWELL CONTROLS

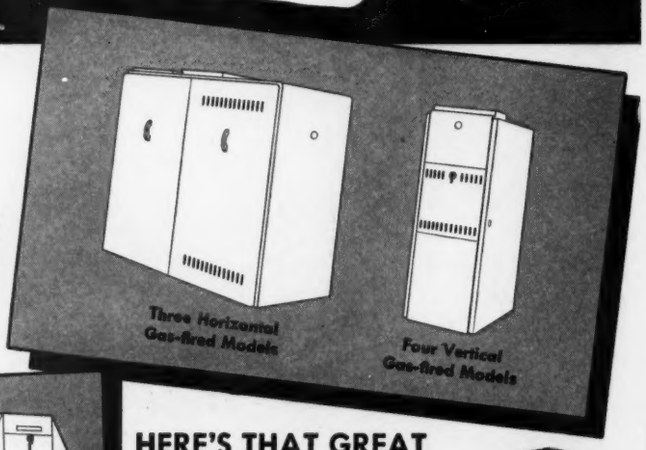
MINNEAPOLIS-HONEYWELL

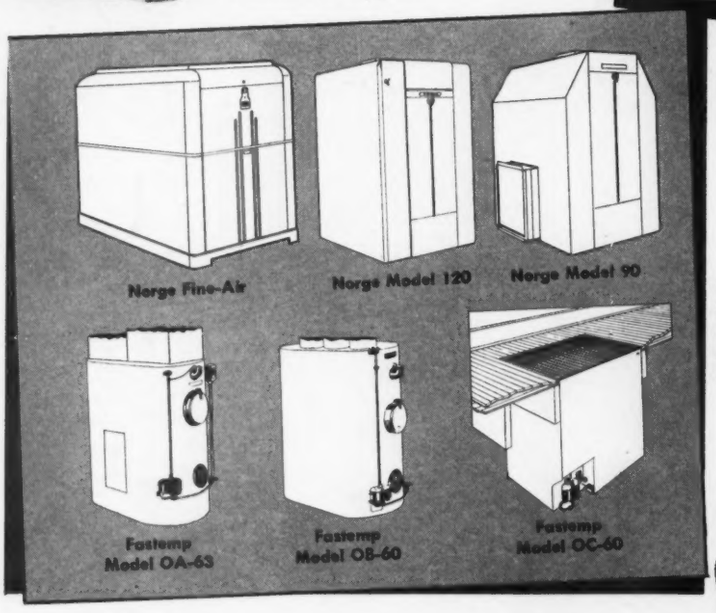
CONTROL *Systems*

"SAY-DID YOU SEE THE LATEST NORGE ANNOUNCEMENT-A COMPLETE LINE OF GAS-FIRED AIR-CONDITIONERS"
"YES-THAT MAKES THE NORGE LINE SO COMPLETE THAT THE NORGE DEALER CAN SELL JUST ABOUT EVERYBODY!"

HERE ARE THE NEW NORGE *GAS-FIRED* AIR CONDITIONERS

Three horizontal models, 98,000 B.T.U., 120,000 B.T.U. and 145,000 B.T.U. output. Two vertical, side inlet models, 52,000 B.T.U. and 74,000 B.T.U. output. Two vertical models with bottom inlet, also 52,000 B.T.U. and 74,000 B.T.U. output. Approved American Gas Association. No finer engineering or construction at any price.





HERE'S THAT GREAT NORGE LINE OF *OIL-FIRED* AIR CONDITIONERS AND FURNACES

This is the line that's making history. Sales for first 90 days of 1941 more than first half of year 1940. Actually selling in carloads and making plenty money for Norge dealers.

HERE'S THE NEW NORGE *OIL-FIRED* WATER HEATERS

Four models completely cover the big volume market where sales are booming. Low first cost, very low fuel cost, fast recovery.

Four Oil-fired Water Heater Models

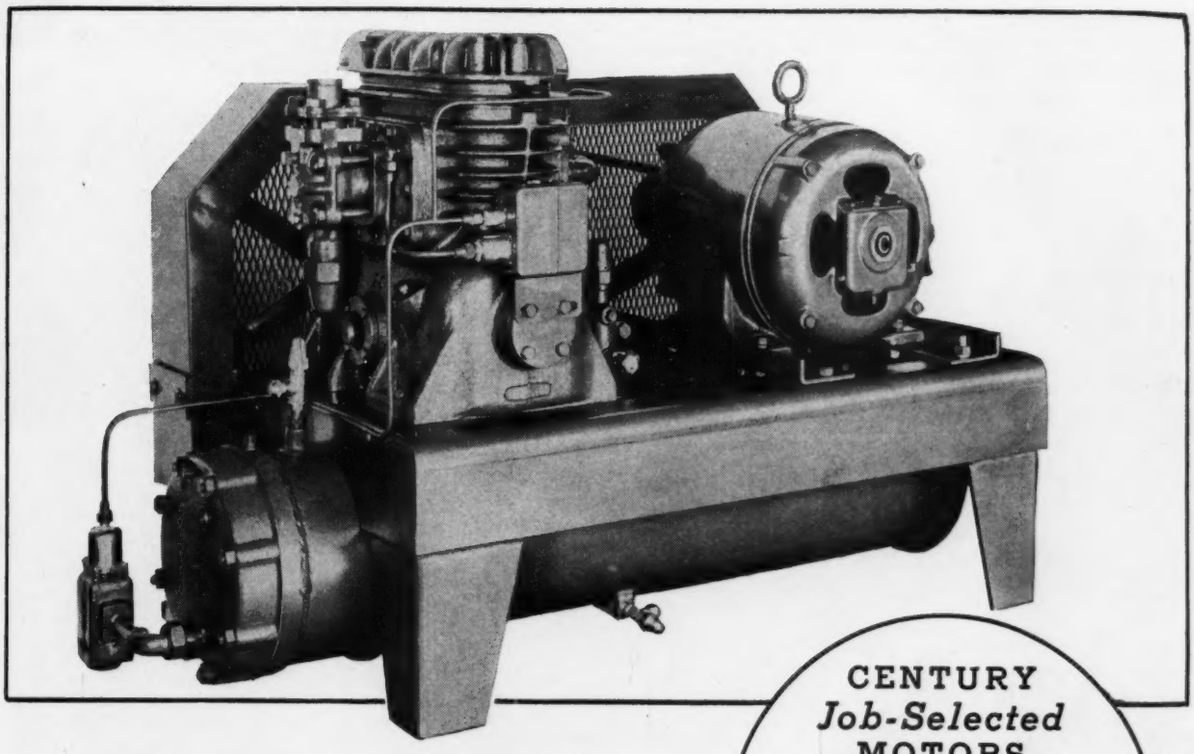
TO make money in this heating business you've got to have products that sell fast and easy, stay sold, and pay you a good profit—and that just about describes the Norge line. Norge oil-fired units have broken all sales records—and profit records for Norge dealers. Water heater volume is piling up fast. And, with gas-fired units added, the Norge dealer can sell just about everybody. There's a big opportunity for you with Norge. Send for details.

See* NORGE *before you buy!

NORGE HEATING AND CONDITIONING DIVISION

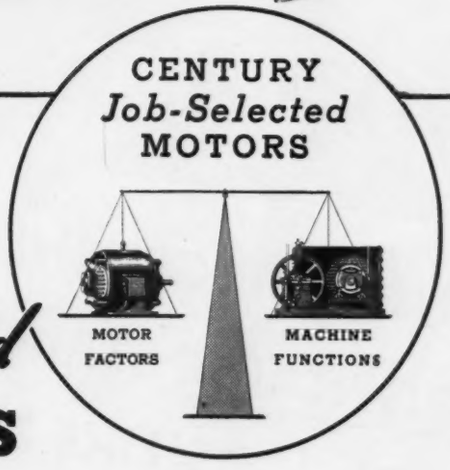
BORG-WARNER CORPORATION

12345 Kercheval Avenue • Detroit, Michigan



Balance the Demands of Modern Compressors with

CENTURY *Job Selected* Type SCH MOTORS



Check the following reasons why Century Type SCH polyphase motors meet the exacting functional demands of the modern refrigeration compressor not equipped with an unloader.

1. Because of their high starting and accelerating torque, which is necessary in starting the modern compressor without overmotoring the running load.
2. They are unusually quiet when starting.
3. They are quiet running — eliminating a common source of customer dissatisfaction.
4. Locked rotor and starting currents conform to E.E.I. and N.E.M.A. limits.
5. Long motor life, due to excellent mechanical construction and Century perfected insulation. Moisture resisting insulation gives extra protection against dampness and humid climates.
6. Easily kept clean outside, keep themselves clean inside.
7. Attractive appearance that matches modern compressor design.

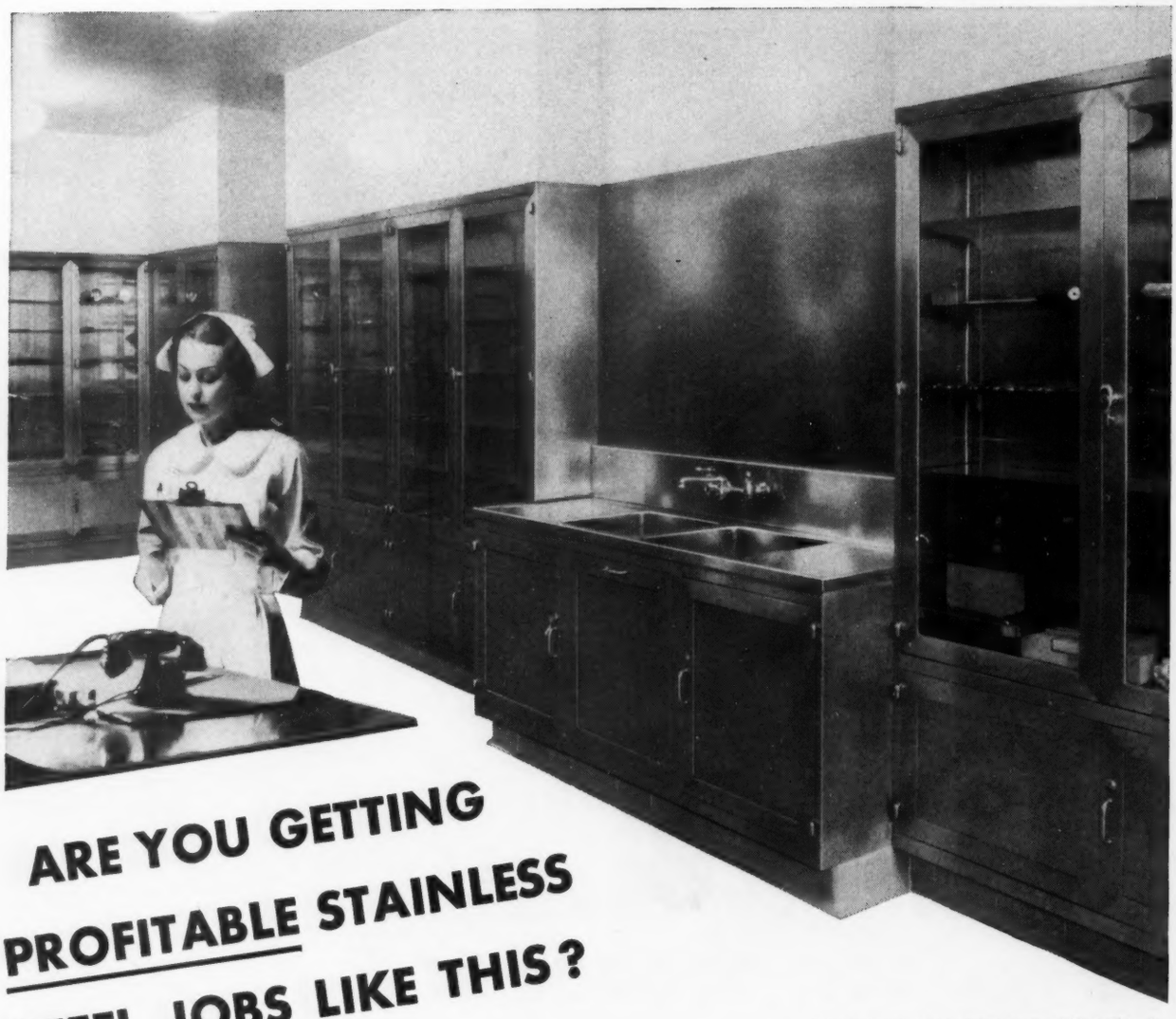
Whatever your electric motor requirements in the entire field of air conditioning — cooling, heating, ventilating or pumping — you'll find the correct Century Motor to exactly balance the demands of the load and its starting and operating conditions.

Century's wide selection of motor types and sizes, from fractional to 600 horsepower makes such proper selection possible. For all the advantages to be found in Century Job Selected Motors, see your nearest Century Motor Specialist today.

CENTURY ELECTRIC COMPANY
1806 Pine St. St. Louis, Missouri
Offices and Stock Points in Principal Cities

Century MOTORS

One of the Largest Exclusive Motor and Generator Manufacturers in the World



ARE YOU GETTING PROFITABLE STAINLESS STEEL JOBS LIKE THIS?

CUPBOARDS AND SINK built of U·S·S Stainless Steel to insure sanitation in a modern hospital. U·S·S Stainless is easy to fabricate, can be formed and worked with little change in shop methods.

THIS U·S·S Stainless Steel hospital installation is a job that represents a sizable profit for any sheet metal shop.

Notice the work. It's neat and trim . . . but of a straightforward design that can be duplicated in most well equipped shops. The sink is similar to one you might make for a private home.

By specializing in stainless steel, the fabricator of this equipment has built a steady, profitable business. His reputation for good work has created a demand for his products in fields far removed from his local territory.

Every food servicing establishment represents an opportunity for equipment made of U·S·S Stainless Steel. Store fronts, filling stations, homes, churches, industrial plants, dairies are fertile fields for the alert sheet metal man.

Almost every town has need for one or two shops that can turn out good work in stainless steel. The endless possibilities of this brilliant metal give you a chance to develop highly profitable specialties.

We'll be glad to send you material on how to fabricate U·S·S Stainless. Just write to any of the companies below for complete information.

U·S·S STAINLESS STEEL

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
NATIONAL TUBE COMPANY, *Pittsburgh*

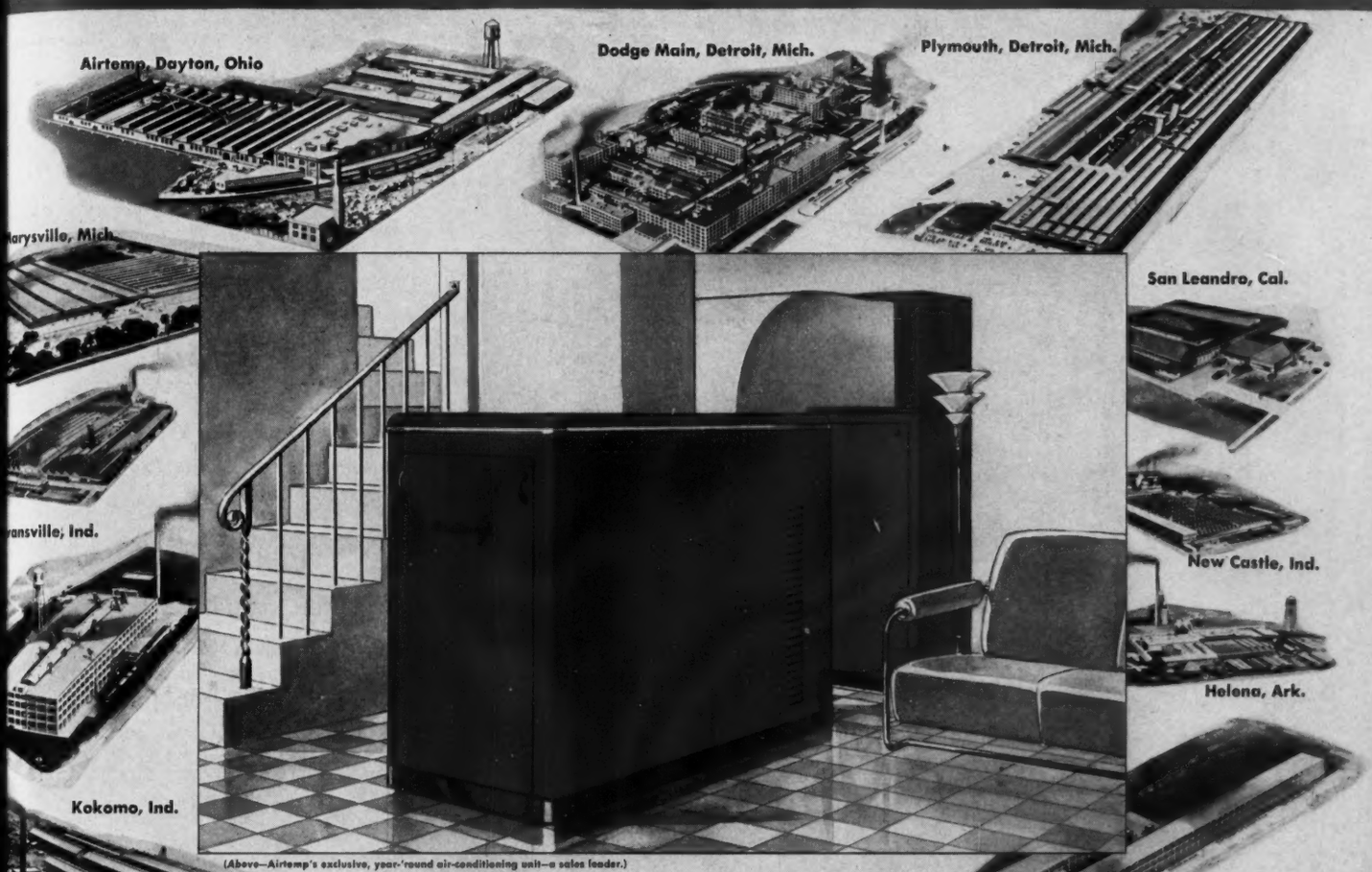
Scully Steel Products Company, Chicago, *Warehouse Distributors* · United States Steel Export Company, New York

USS

UNITED STATES STEEL

CHRYSLER AIRTEMP

HAS A MONEY-MAKING PROPOSITION FOR DIRECT DEALERS



(Above—Airtemp's exclusive, year-'round air-conditioning unit—a sales leader.)

Ten thousand successful dealers make possible the operation of all these Chrysler Corporation plants.

THE CHRYSLER AIRTEMP *Proposition*

Chrysler Airtemp has a new, profitable Proposition for dealers—based on the same principles which have made Chrysler motor car dealers prosperous—(1) A Complete line. (2) Competitive prices. (3) Adequate gross profits. (4) Factory cooperation. (5) A nation-wide reputation.

Send for this money-making Proposition today!

Airtemp Division, Chrysler Corporation, Dayton, Ohio

Gentlemen:

Let me see your money-making proposition for dealers.

Name _____

Address _____

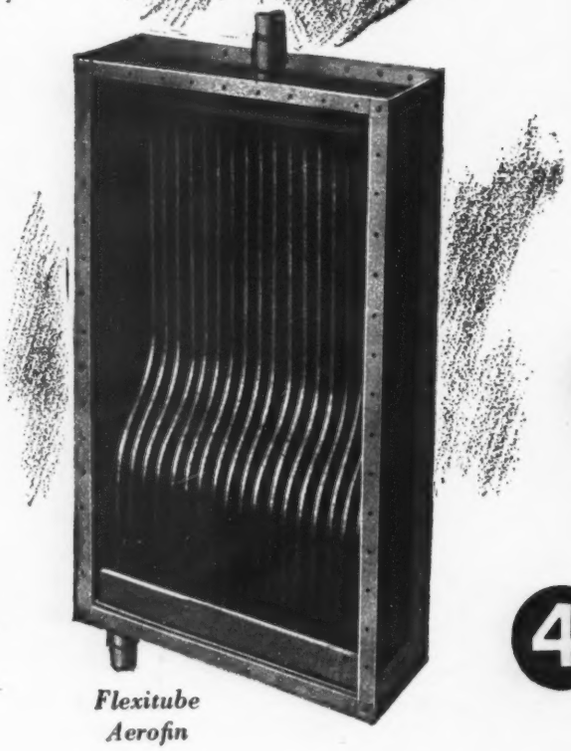
City _____ *State* _____

(A)

Consider these Superior Points about

AEROFIN
Heat-Exchange Surface

1 Flexitube Aerofin has a core which is completely non-ferrous, having copper tubes and cast bronze headers.



Flexitube Aerofin

2 Flexitube Aerofin has patented joints between tubes and headers which are brazed at 1200° F., the resulting bond being stronger than the tube itself.

3 Flexitube Aerofin has a patented crown type orifice in steam end of each tube, which assures adequate steam supply at all times and prevents clogging of the tube inlet by scale.

4 Flexitube Aerofin has offset bend in each tube to relieve differential expansion and contraction strains in the tubes, thus putting no strain either on tube or joint.

Send for descriptive literature.

AEROFIN CORPORATION

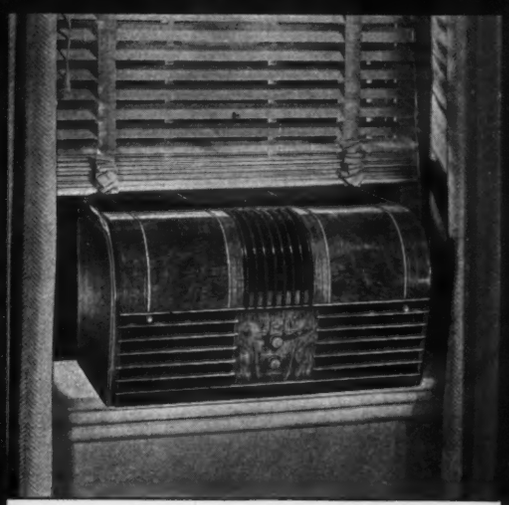
410 SOUTH GEDDES STREET
SYRACUSE, N. Y.

Chicago • Detroit • New York • Philadelphia • Dallas • Atlanta

AMAZING NEW RETAIL BUSINESS

with high unit of sale and big dollar profit!

- No Saturation
- No Trade-ins
- No Expert Service



Single-Unit Air Conditioning . . . the new, great, big-profit retail appliance business . . . growing faster every day! Easy-to-handle package merchandise . . . quick installation . . . no plumbing . . . no wiring. No technical problems. No trade-ins . . . FULL PROFITS!

PHILCO-YORK

SINGLE-UNIT AIR CONDITIONERS

Lead the World in Sales!

In a short space of time Philco-York has become the world's *biggest-selling* Single-Unit Air Conditioner. Nearly ONE-HALF of *all* the Single-Unit Air Conditioners sold last year were Philco-York Units!

And for 1941, An Even More Saleable Line

New improvements, greater efficiency, new beauty . . . at prices below the average of the industry in every bracket! And a tremendous market is open to you . . . every home and office . . . hotels . . . hospitals. Quick, easy sales, with plenty of repeats! Philco-York will pull inquiries from this market with a gigantic direct mail campaign and ads in the leading professional magazines . . . *sales-producing leads that will be sent to you!* And there are beautiful window displays, banners, streamers, electric signs and colorful literature for your store! Don't wait . . . see your Philco-York Distributor or mail coupon now!

NOW—Real, Complete, Efficient Single-Unit Air Conditioning at a Price the Public Can Pay!

Model 76-A (*Illustrated*)

- **Cools and Conditions Room Air.**
- **Dehumidifies. Moisture is wrung out of the air, leaving it cool, dry, stimulating.**
- **Draws in Fresh, Outside Air.**
- **Filters Out Dirt, Dust and Pollen. A boon to hay fever sufferers!**
- **Circulates the Air.**
- **Shuts Out Street Noises.**
- **Removes Stale, Stuffy Inside Air.**
- **Gives Pure Air All Year 'Round.**

There's a Philco-York Air Conditioner for Every Size Room, Priced as Low as . . . **$129.50**

MAIL COUPON NOW!

PHILCO, Air Conditioning Dept. 562
Tioga and C Streets, Philadelphia, Pa.

Please send me full details of your dealer franchise proposition on Philco-York Air Conditioners, together with Discounts and Special Wholesale Credit Terms. Also send big, new Illustrated Booklet.

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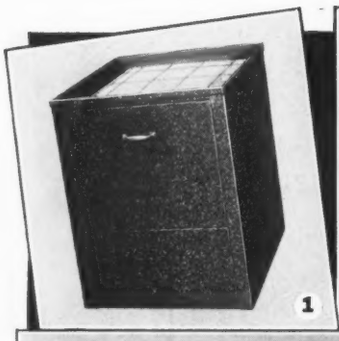
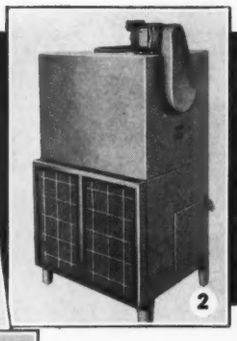
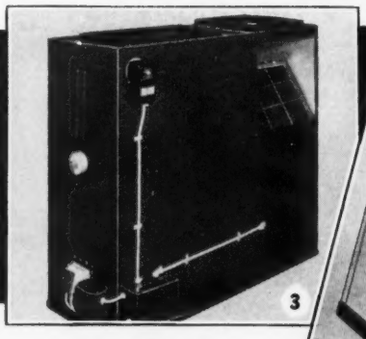
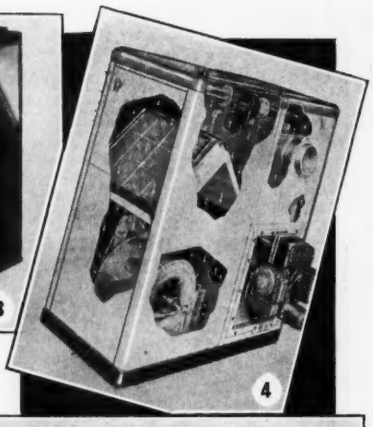
STREET_____ COUNTY_____

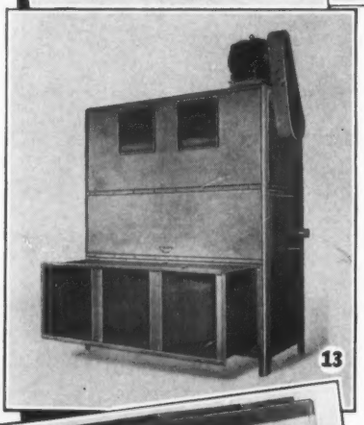
CITY_____ STATE_____









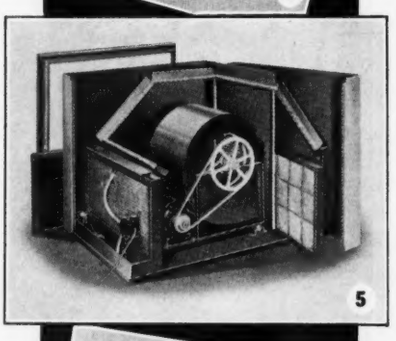


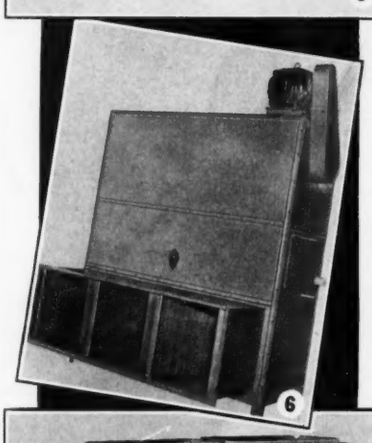
Because they **STOP MORE DUST, HOLD MORE DUST,** *and are* **EASIER TO SERVICE**

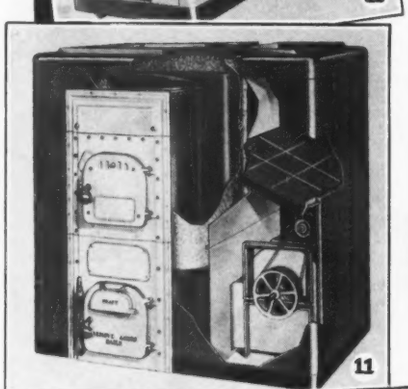
RESEARCH AIR FILTERS

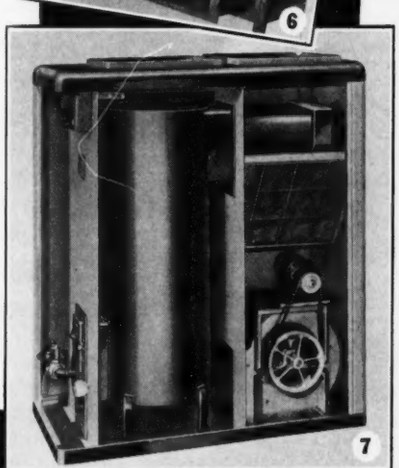
are now standard equipment, specified by the manufacturers of America's leading air conditioning residential furnaces and industrial blowers. These are just a few:

(1) Lau Blower Co., Dayton. Blower unit. (2) McQuay, Inc., Minneapolis. Residential air conditioning unit. (3) H. C. Little Burner Co., San Rafael, Cal. Oil burning cottage unit. (4) Waterman-Waterbury Co., Minneapolis. Residential air conditioning furnace. (5) Hall Mfg. Co., Cedar Rapids. Furnace blower. (6) Peerless of America, Chicago. Weather Dog. (7) United States Radiator Corp., Detroit. Gas fired air conditioning furnace. (8) The Trane Co., LaCrosse. Climate Changer. (9) The Heil Co., Milwaukee. Activ-Air conditioning unit. (10) Carrier Corp., Syracuse. Ventilating Thermomaster. (11) Armstrong Furnace Co., Columbus. Residential air conditioning furnace. (12) Lennox Furnace Co., Marshalltown, Iowa. Oil fired air conditioning furnace. (13) Fairbanks-Morse Co., Chicago. Industrial air conditioning unit.



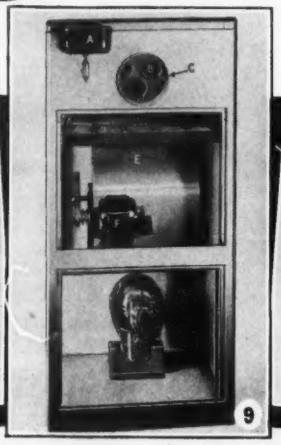


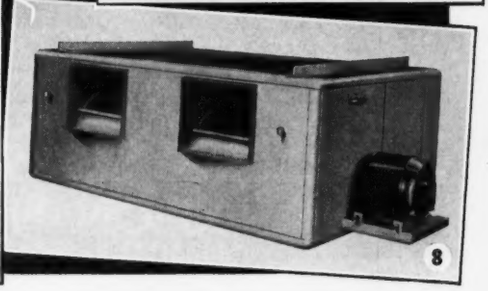




RESEARCH PRODUCTS CORP. RP MADISON WIS.

For further information, data units and price sheets on RESEARCH AIR FILTERS write Research Products Corporation, Madison, Wisconsin.





MEYER FURNACE COMPANY
WEIR MEYER
PEORIA, ILLINOIS

EW BUYING POWER AT THE RATE OF $500,000.00 A MONTH

That is what the defense program is already meaning to the people of America (according to a National statistics service) and the rate will be even higher by fall.

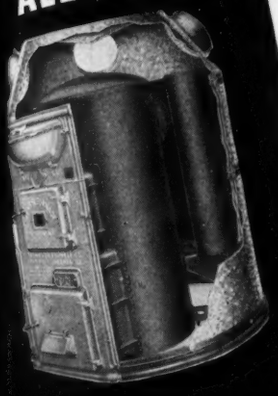
That means more money to spend for the things people want . . . NEW HOMES . . . BETTER HOMES . . . BETTER HOME EQUIPMENT . . . NEW FURNACES FOR SOME . . . MODERN AIR CONDITIONING FOR OTHERS . . .

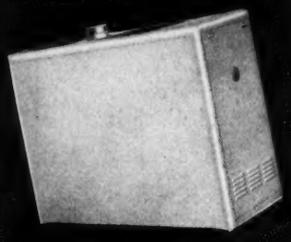
AND GREATER SALES OPPORTUNITIES FOR ALL WEIR-MEYER DEALERS!

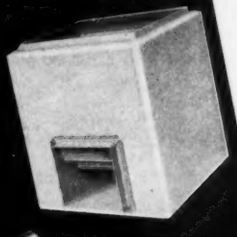
Why WEIR-MEYER? Because WEIR-MEYER dealers have EXCLUSIVE territories. . . . They have a complete line for ALL fuels. . . . They have a "price-competitive" series of STEEL Weir furnaces. . . . They have a supreme QUALITY line. . . . They can sell and install anything from a replacement furnace to the most modern and efficient air-conditioning system that the home-owners and builders of today demand.

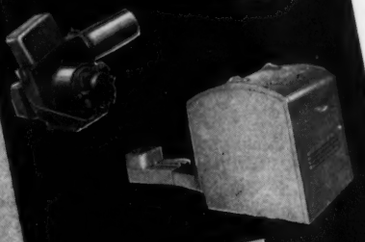
And back of every installation will be three-quarters of a century of accumulated experience as leaders in the development of BETTER HEATING.

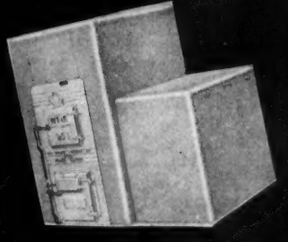
ALL FUELS











For EVERY TYPE OF ...ATION

Weir-Meyer dealerships "just keep on keeping on". When they "move to Weir" many make their last move—and that's the way WE like the outcome, too! 25-year-olds are not uncommon.

Every dealer gets our complete line of sales helps (including low-rate non-recourse financing—because YOUR sales are OUR sales and we work with you.

Asking for full details on the coupon doesn't obligate you in any way—but it CAN be the first move you make toward a business connection that you will, some day, hand on to your son!

THE MEYER FURNACE COMPANY
PEORIA, ILLINOIS

Mfrs. of WEIR and MEYER Steel Furnaces & Air Cond. Equipment.

(Sign or clip to your letterhead and mail)

The Meyer Furnace Company,
Peoria, Ill.

Please send all details concerning Weir-Meyer Dealerships.

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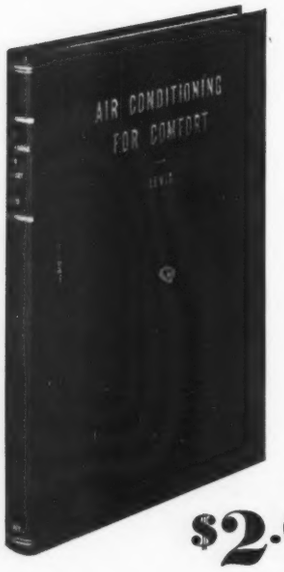
IMPROVE YOUR KNOWLEDGE OF AIR CONDITIONING



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Here is a book that presents—in simple, readily understandable form—every kind of information necessary for an accurate and thorough knowledge of air conditioning principles, equipment, and practices. Written by S. R. Lewis, a widely-known consulting engineer who has been active in air conditioning work for more than thirty years, it deals with all angles of the air conditioning subject from the practicing engineer's viewpoint. The designing procedures explained in the book are, for example, in every detail the same procedures employed today by the author's own organization.

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Engineers in air conditioning will find the new "Air Conditioning for Comfort" invaluable as a reference book, while salesmen, students, and others may rely on it to give them a clear knowledge of fundamentals, and of the latest air conditioning methods and equipment.

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CHAP. 5—The Psychrometric Table and Chart
CHAP. 6—Humidity Controllers and Control
CHAP. 7—Heat Transmission Through Barriers
CHAP. 8—Ventilation, Solar and Appliance Heat
CHAP. 9—Heating Systems
CHAP. 10—Air Conditioning Systems
CHAP. 11—Air Conditioning Apparatus
CHAP. 12—Refrigeration and Refrigerants
CHAP. 13—Refrigeration Compressors and Condensers
CHAP. 14—Refrigeration Evaporators and Auxiliaries
CHAP. 15—Record Forms for Heating and Cooling
CHAP. 16—Air Distribution
CHAP. 17—Water in Air Conditioning
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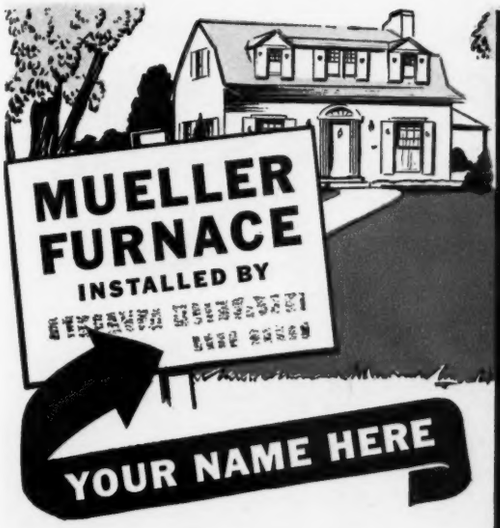


means

- ✓ *an easy, profitable sale*
- ✓ *a simple installation*
- ✓ *dependable, economical performance*
- ✓ *a satisfied, happy owner*

...and that spells "SUCCESS" in any furnace dealer's language

An *easy sale,* because Mueller's name is kept constantly before the public in Mueller advertising, and wins ready acceptance . . . a profitable sale because Mueller's complete line includes the extra-profit "package" combinations of automatic heating and winter air conditioning.

With Mueller, you are equipped to go after *all* the jobs, big and little, gravity and forced air, *for any fuel.* No makeshift combinations.

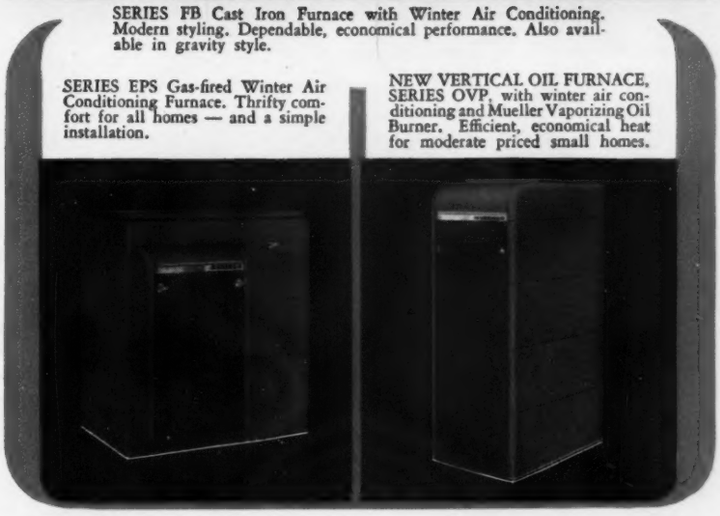
Installation is easier because Mueller furnaces are completely assembled at the factory, to make certain that all parts fit.

Performance, economy and dependability — because each Mueller furnace is designed for a specific fuel — coal, oil or gas.

Add your skill as a craftsman, and you have all it takes to make customers happy and build a reputation as the leading furnace installer in your territory.

Put Mueller's name beside yours on this season's jobs, for prestige and profits . . . If you do not know the Mueller distributor in your territory, write us. Send for Mueller's free literature. *L. J. Mueller Furnace Company, 2010 W. Oklahoma Avenue, Milwaukee, Wisconsin.* D-6

SERIES FB Cast Iron Furnace with Winter Air Conditioning. Modern styling. Dependable, economical performance. Also available in gravity style.



SERIES EPS Gas-fired Winter Air Conditioning Furnace. Thrifty comfort for all homes — and a simple installation.

NEW VERTICAL OIL FURNACE, SERIES OVP, with winter air conditioning and Mueller Vaporizing Oil Burner. Efficient, economical heat for moderate priced small homes.

Mueller advertising makes your selling easier

When a new home is being planned, you can be pretty sure that the owner, builder, and architect know about Mueller furnaces — for they read regularly the magazines in which Mueller advertising consistently appears . . . they are familiar with Mueller's handsome designs... Why do *all* the work—when you can feature a line that is already half-sold before you begin? Sell Mueller.

MUELLER *Milwaukee*
HEATING AND AIR CONDITIONING

Gas · Oil Coal

"HELP US GET THIS BRIDGE DOWN OUT OF THE AIR!"

Superintendent of erection crew for engineering concern repairing 62nd Street Bridge called us on the phone saying, "We have one end of this bridge up in the air and we can't make a move until we get 2 plates 18 x ½ x 1' 7" and 2 plates 18 x ⅜ x 1'7"." We cut the plates, put them in a passenger car and he had them in fifty minutes.

. . . SCULLY PITTSBURGH WAREHOUSE

YOU may never have a problem like this but probably have many that are just as troublesome. If the solution is getting some steel in a hurry we suggest you "Call Scully and relax." Our business is getting all kinds of steel, steel products, copper and brass into customers hands—quick. We always hurry, whether or not you say "rush." Small orders, big orders, rush orders, regular orders—they all get the same friendly, efficient service that has made the Scully name famous.

Eight warehouses are located in the big manufacturing centers. Phone, write or wire.

Scully Service

The Mark of Service

ALLOYS
ANGLES, HOT ROLLED and COLD ROLLED
ARCHES (CORRUGATED)
BABBITT
BANDS and HOOPS
BARS, HOT ROLLED
ALLOYS (HR and CF)
COLD FINISHED
ELECTRIC HIGH CARBON STEEL
REINFORCING
BEAMS and C. B. SECTIONS
BEEF RAIL
BOLTS, NUTS, WASHERS, ALL KINDS
BORING and TURNING BARS and GRINDERS
BRACES, BOILER
CHAIN, ALL KINDS
CHANNELS
CHISELS
CHUCKS, STAYBOLT
CLAMPS, BOILERMAKERS
CLIPS, PATTERSON
CLEANERS, FLUE
CONDUCTOR PIPE
COPPER and BRASS
COUPLINGS, HOSE
CRAYONS, SOAPSTONE
CUTTERS
DARDELET RIVET and MACHINE BOLTS
DRILL RODS
EAVE TROUGH and FITTINGS
EXPANDERS, FLUE
FERRULES, COPPER
FLANGES, BOILER and TANK
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HANDLES, HAMMER
HEADS, TANK and FLANGE
HOISTS, HAND and POWER
IRON, STAYBOLT
LUGS, BOILER, TANK and SILO
MACHINERY, HAND and POWER
MANHEAD PLATES and FITTINGS
NAILS
PACKING
PAINT STICKS
PLATE STEEL, STANDARD QUALITIES
ABRASION RESISTING
COR-TEN and MAN-TEN
PLUGS, FLUE
RAILS and FITTINGS
REAMERS
SHAFTING
SHEETS
ABRASION RESISTING
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COR-TEN and MAN-TEN
HOT ROLLED and UNIFORM BLUE
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GALVANIZED and GALVANNEALED
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SPRING STEEL BARS and SHEETS
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USS

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Distributors of Steel, Steel Products, Copper and Brass

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ST. PAUL-MINNEAPOLIS · CLEVELAND · PITTSBURGH · BALTIMORE

UNITED STATES STEEL

"IF *you're not making enough money...*

TURN TO GE "

"I DID"

says S. O. Oleson, who is now a very successful G-E Dealer in Meriden, Connecticut. "Read what I have learned about making money with the complete G-E line."

"WE ALL KNOW that a manufacturer makes money *only* if his dealers do. In other words a big company like General Electric succeeds because its dealers are successful. And G-E succeeds only because it makes *quality products that its dealers can sell.* That's exactly why I make money."

G-E REACHES THE MOST CUSTOMERS!

"It's the one biggest reason for my success. I have something G-E to sell to everybody, in practically every type of business and every income level.

"You can't fly on one wing and you can't keep profits rolling in regularly without a *complete* line. General Electric Cooling, Commercial Refrigeration and Heating—all add up to a mighty nice *year 'round* business for me."

G-E DOESN'T MISS A TRICK!

"The right products must have good selling, of course. And that's where G-E steps in and helps dealers like me. G-E doesn't miss a trick. Dealer training is a G-E fundamental. Setting up the dealer's business on a working basis is another. Local cooperative and national advertising, direct mail, display, literature, and so on.

"Whatever I need to supplement my own personal selling, G-E's got it. I don't know of any company that gives more complete dealer backing. All these, along with the right *all-year* products, are what help me *make the sales!* I'm sold on G-E because I really *sell* G-E!"

SEE THE MOST COMPLETE MONEY-MAKING LINE IN THE INDUSTRY —ON THE OTHER SIDE

USE THIS HANDY POST CARD

SEE OTHER SIDE . . . MAIL TODAY

NO POSTAGE REQUIRED

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD
First Class Permit No. 138, Sec. 510, P. L. & R.
Bloomfield, N. J.

GENERAL ELECTRIC CO.
5 LAWRENCE STREET
BLOOMFIELD, N. J.

"IT'S THE *COMPLETE* . . . YEAR-'ROUND PROFIT LINE"

FOR AMBITIOUS DEALERS WHO WANT TO MAKE MONEY

MAIL FREE POST CARD (BELOW) FOR FULL DETAILS

OIL BURNERS

OIL BURNERS

An attachment type burner. Priced on the nose with competition. Many exclusive features—1 to 3 gal. per hr.—141,000 to 423,000 Btu per hr. For steam, vapor, hot water and warm air systems. Owners report up to 25% fuel savings.

OIL FURNACES

OIL FURNACES (BOILERS)

The one outstanding furnace on the market today. Owners report fuel savings of 25% to 50%. Domestic hot water coil optional. 7 sizes: 0.7 to 4.25 gal. per hr.—75,000 to 450,000 Btu per hr. For steam, vapor and hot water systems. Compact, easy to install. Competitively priced.

GAS FURNACES

GAS FURNACES (BOILERS)

Fast steaming at low cost. Gas pressure regulator, high steam transfer, complete combustion—for greater economy. A. G. A. approved. 9 sizes: 1.1 to 10.3 boiler hp.—39,000 to 345,000 Btu per hr. For steam, vapor and hot water systems.

WARM AIR FURNACES

WARM AIR FURNACES

Abundant heat (*oil or gas fired*) *plus winter air conditioning—at no extra cost.* Humidifies and filters, circulates *heated* air. OIL: 3 sizes, 0.95 to 1.90 gal. per hr.—100,000 to 200,000 Btu per hr. GAS: 14 sizes, 60,000 to 270,000 Btu per hr. Listed by Underwriters' Laboratory.

AIR CIRCULATORS

AIR CIRCULATORS

Complete, new and different line for 1941. 5 models: 20" to 48" fans, window and attic mounting — 3500 to 16,000 cfm. All low cost, volume sales makers!

STORE COOLERS

STORE COOLERS

Famous G-E "*Packaged Weather.*" A wide market among homes, restaurants, stores, shops, hotels and hospitals. 6 sizes: 1½ to 10 hp.—19,740 to 113,400 Btu per hr. net cooling capacity. Available on small down payment with skip-payment plan.

ROOM COOLERS

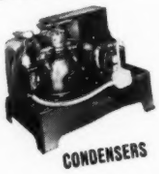
ROOM COOLERS

Completely self contained, compact, quiet and economical in operation. New models with exclusive, saleable features—priced to meet competition. Floor models: ½ and ¾ hp.—6,600 to 8,700 Btu per hr. Cools, circulates, ventilates, dehumidifies and cleans the air. Window sill model: ½ hp.—5,400 Btu per hr.

WATER COOLERS

WATER COOLERS

17 different models—53 specific sales features. Sealed condensing units in office models to reduce service losses. G-E has contributed more outstanding features to water cooler design than any other manufacturer. A profitable *year-'round* market.



CONDENSERS

CONDENSING UNITS

The famous G-E Scotch Giant Condensing Units are the "heart" of efficient cooling. 15 types—air cooled ¼ to 3 hp. 8 types—water cooled—⅓ to 3 hp. (There's a steady replacement market alone in these units.)

CONDITIONED AIR COOLERS

CONDITIONED AIR COOLING UNITS

Only G-E has *Conditioned Air* Cooling Units. 8 types—wall and ceiling mounted—delivery capacities 1,400 to 12,000 Btu per hr. A big market in every business requiring food storage, reducing or eliminating food odor transfer and food shrinkage, correcting humidity.

STORAGE CABINETS

STORAGE CABINETS

Self contained ready to plug-in and remote units—reach-in and walk-in G-E Commercial Storage Cabinets and G-E Dairy Merchandisers. Also—the G-E Ice Cube Maker—⅓ hp., 5 cu. ft. Here is another market that pays year 'round dividends.

BEVERAGE COOLERS

BEVERAGE COOLERS

A popular line of wet storage beverage coolers with strong sales features. Three models—⅕ to ½ hp. Cooling capacity, 56 to 185—6 oz. bottles. Wherever bottled beverages are sold—a *profitable* market.

FOR YEAR 'ROUND PROFITS—MAIL TODAY

GENERAL ELECTRIC CO.
Div. 253, Bloomfield, N. J.

I want all details on the G-E Dealership for my territory ☐ particularly on the items checked.

☐ OIL BURNERS	☐ WARM AIR FURNACES	☐ ROOM COOLERS	☐ CONDITIONED AIR COOLING UNITS
☐ OIL FURNACES	☐ AIR CIRCULATORS	☐ WATER COOLERS	☐ STORAGE CABINETS
☐ GAS FURNACES	☐ STORE COOLERS	☐ CONDENSING UNITS	☐ BEVERAGE COOLERS

NAME_____

STREET_____

CITY_____ STATE_____

NO POSTAGE REQUIRED

PLUS

ORGANIZING • TRAINING • ADVERTISING • PROMOTION

If it helps you make sales—G-E's got it for you! National magazine, trade and specialty, cooperative local newspaper advertising—direct mail — literature — display — billboards — publicity — dealer and customer publications—stationery—business organization and assistance—sales manuals—application engineering, service and installation assistance.

FILL IN CARD—MAIL IN TODAY!

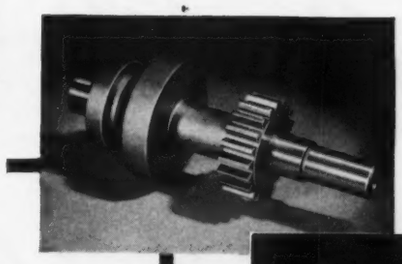
THE POST OFFICE WILL ACCEPT THIS CARD — NO POSTAGE NEEDED

GENERAL ELECTRIC

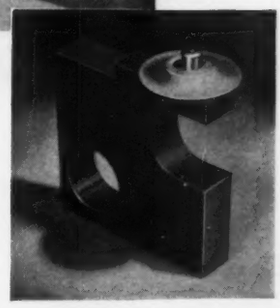
SURPRISED AT YOUR LOCKFORMER'S PERFORMANCE?

HERE ARE THREE REASONS FOR ITS UNFAILING PRECISION—ITS YEAR IN AND YEAR OUT DEPENDABILITY.

1 ONE PIECE ROLLS, GEARS AND SHAFTS . . . the ONE construction that definitely and permanently eliminates mis-alignment. No taper pins or keyways to cause trouble. Entire unit specially heat treated—shafts ground to .0005 tolerance.



2 PATENTED, POCKET OPENING ROLL . . . locks always uniformly open . . . no further hand shaping or prying necessary. Both depth and width of pocket are definitely controlled.



3 ROLLER BEARINGS USED THROUGHOUT . . . at every friction point! Minimum power requirements, minimum wear, minimum friction.

★

Comments like ". . . works as good today as the day I received it," ". . . never seems to need attention," ". . . turns out a perfect lock, EVERY time," are just a few of the tributes given the Lockformer by you owners. Naturally, performance of this kind doesn't "just happen"; it's built in—and the three reasons given above are mighty important factors.

They're not the whole story, of course. We can't, for instance, divulge why the Lockformer's Hammer Over Edge is always uniform, regardless of the number of notches made in the sheet. Or why the Lock never runs off the edge of the sheet, even though the material has not been perfectly squared. Or why the Lockformer needs no adjustment for gauge, yet handles its entire range of thicknesses with equal efficiency.

But we can say this: If you're surprised NOW—Mister, you're going to be a lot more surprised a few years hence. For when 1945 rolls around, your present Lockformer, in all probability, will be running just as smoothly, just as efficiently and just as economically as it does today.

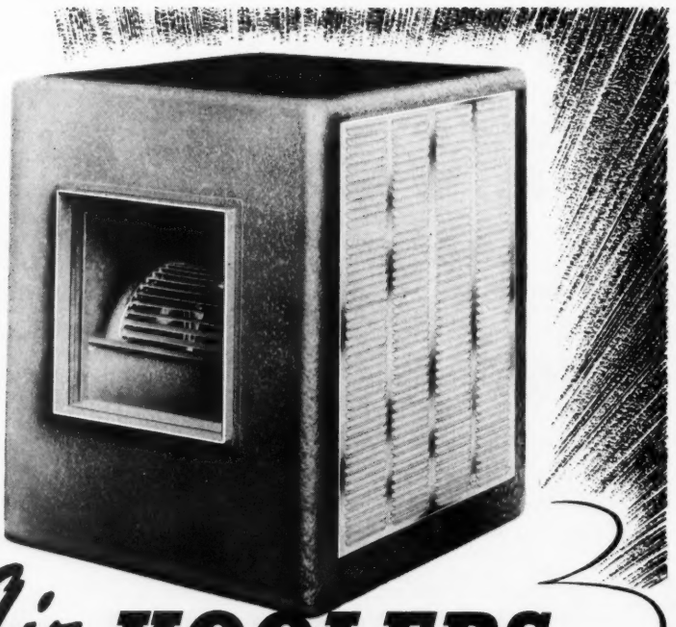
DO YOU KNOW . . . that your present Lockformer can be fitted with the new Power Flanger Attachment? With this attachment, your "22," for instance, can be set up for three jobs without the necessity for any changeover.

Once installed (by yourself or our representative) the Flanger is a permanent fixture—doesn't interfere with the permanently mounted Pittsburgh rolls or with the optional mounting shafts upon which either Drive Cleat or Double Seam Rolls may be used. (Descriptive bulletin sent upon request.)

THE LOCKFORMER COMPANY

4615 ARTHINGTON STREET **CHICAGO, ILLINOIS**

Proven Profits

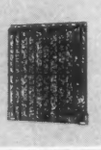


with UTILITY Air KOOLERS

Only
UTILITY Air KOOLERS
combine all these
Proven features

UNI-FLOWMETER
Patent Pending
Assures uniform water distribution to all pads

"NO-SAG" PADS
Patent No. 2,182,501
Can't slip or settle to cause void air spaces



STREAMLINE PAD GRILLES
Permit unrestricted air flow—reduce static pressure

Dynamically Balanced Centrifugal BLOWER
Operating cost is low—efficiency high

The Market is *Proven*

In every part of the country evaporative air cooling is making tremendous gains, yet the market hasn't really been scratched. Every business establishment, factory and home is a prospect for this efficient, economical method of comfort cooling.

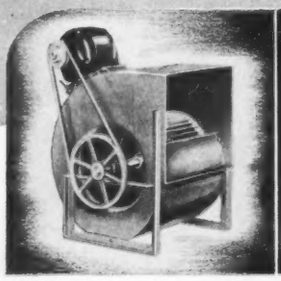
The Product is *Proven*

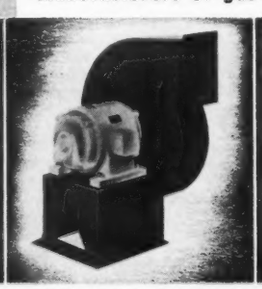
Thousands of satisfactory installations have proven Utility air Koolers under all conditions. More Utility air Koolers are in use than any other make. Utility pioneered evaporative air cooling—leads the field. Utility air Koolers are scientifically designed and developed by experienced engineers in a modern, completely equipped laboratory.

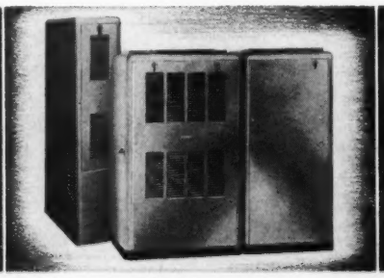
Your profits are assured when you sell Utility air Koolers. They are priced to sell . . . carry a generous profit . . . are best known . . . a complete line of quality products . . . from a dependable source of supply. For catalogs, prices and name of nearest distributor, write

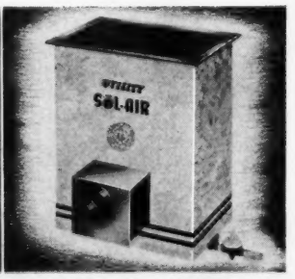
UTILITY FAN CORPORATION
4851 S. Alameda Los Angeles, California

Manufacturers of gas-fired heating equipment, ventilating and cooling equipment









• Standard and Heavy Duty Blowers • Industrial Exhausters • Forced-air Furnaces • Floor and Dual Register Furnaces •

Don't Lose Money on Service Calls due to Motor Failure—

use **WAGNER**

Dependable Air-Conditioning Motors!

The trouble-free performance of Wagner motors builds customer satisfaction and good will. Frequent service calls not only annoy the customer but seriously reduce your profit on an installation. Take a tip from the many manufacturers of air-conditioning equipment who are now using Wagner motors. They have found from actual experience that Wagner motors give dependable service under all types of operating conditions.

No matter what type of air-conditioning equipment is involved . . . whether large or small . . . regardless of the torque, speed or current requirements, you can choose a motor from the Wagner line that is correctly engineered for the job.

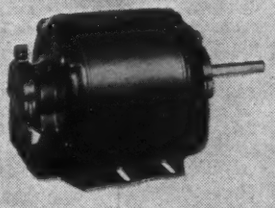
It will pay you to acquaint yourself with the complete line of Wagner motors.

Wagner maintains 25 sales and service branches conveniently located throughout the country. Trained sales-engineers are always ready to assist you in selecting the exact motor for your requirements. Each of the 25 Wagner branches carries a stock of motors ready for immediate shipment.

These **BULLETINS WILL HELP YOU**

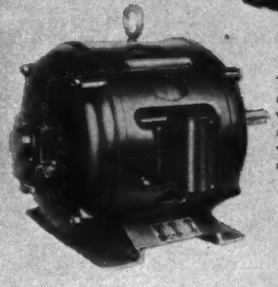
You should have copies of Wagner bulletins MU-177 and MU-182. They contain motor information of value to everyone responsible for the installation of motors. Write for your free copies today.

A FEW OF THE MANY WAGNER MOTORS IDEALLY SUITED FOR AIR-CONDITIONING EQUIPMENT

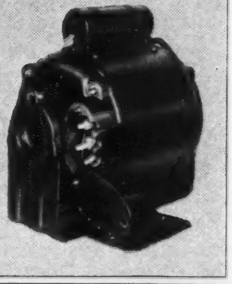


Type M, shaded-pole fan motors are single-phase induction motors of simple construction. Ideal for fan and blower drives in which the fans are mounted directly on the motor shaft. Totally-enclosed and open-type; rigid or resilient mounted; 1/250, 1/125, 1/80, 1/40 and 1/30 hp.

Type RA, repulsion-start-induction motors are single-phase brush-lifting motors having high starting-torque and low starting-current. The ideal motor for heavy-duty applications such as stokers, compressors, pumps, etc. Obtainable in various speeds, frequencies, and voltages; rigid or resilient mounted; 1/8 to 15 hp.



Type RP, squirrel-cage motors are made in 7 electrical types varied as to torque and current characteristics to take care of a wide variety of applications. 2 and 3 phase; 1/6 to 400 hp.



Type RK, capacitor-start induction-run motors are suitable for refrigerators, household air-conditioners, and other appliances. Drip-proof or totally-enclosed end-plates; rigid or resilient mounted; 1/8 to 3/4 hp.

MAIL COUPON TODAY

M 41-4

Wagner Electric Corporation AA

6400 Plymouth Avenue, Saint Louis, Mo., U.S.A.

Gentlemen:
Please send me FREE bulletins MU177 and MU182.

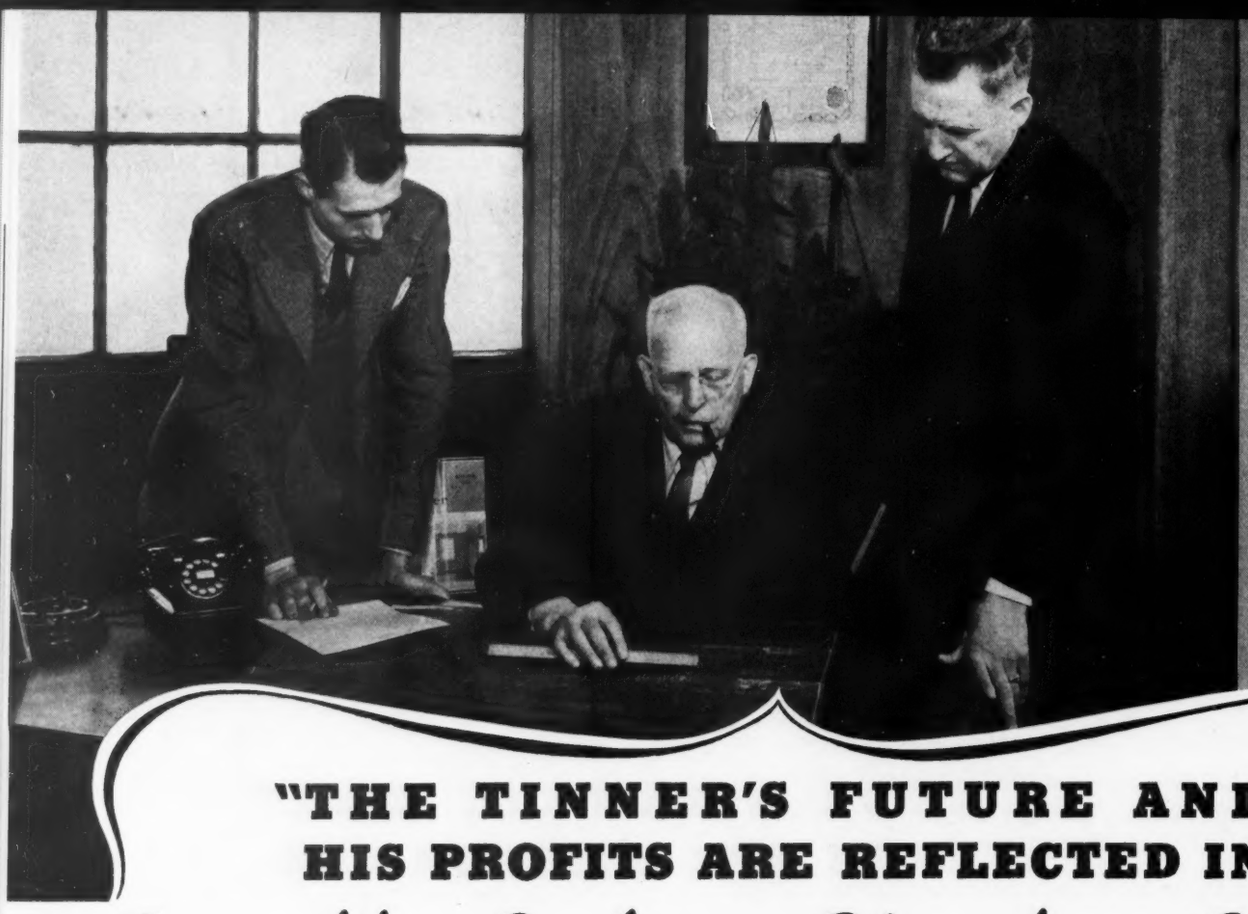
Name_____

Firm_____

Address_____

City_____ State_____

MOTORS • TRANSFORMERS • FANS • BRAKES



Three generations in the A. H. Lumm Co. will tell you that Republic ENDURO can be fabricated in your shop at a profit. They do it every day.

"THE TINNER'S FUTURE AND HIS PROFITS ARE REFLECTED IN *Republic Enduro Stainless Steel*"

This is the prophecy of C. L. Lumm, founder of A. H. Lumm Co., Toledo, after fifty years in the business and after working profitably with ENDURO* for the last 12 years.

Reading Time: 1 minute, 20 seconds

"So many advantages, from a profit angle, result from using Republic ENDURO Stainless Steel, that it is difficult for me to outline all of them. But, from my own experience, here are a few which any up and coming tinner should seriously consider.

1. In the sheet metal field, the applications for stainless steel are almost unlimited, and the field has been hardly scratched.
2. You remove yourself from the 'dog eat dog' kind of competition.
3. You can look over the jobs and select the most profitable ones.
4. Every job is a good profit maker.

"Is it any wonder that I have been preaching to my son and my grandson, who are carrying on for me now, to keep after stainless business? I pass along the same advice to all my tinner friends.

"Many fellows steer away from stainless steel because they feel the metal is too difficult to work. I've found that if a man knows how to fabricate ordinary metal, he can fabricate Republic ENDURO Stainless Steel without difficulty. It may take a few warmup jobs to get started, but after that there's nothing to it.

"I got started in stainless steel 12 years ago when a large scale company specified Republic ENDURO Stainless Steel for pans to be used in meat packing plants. Evidently our first lot of pans was satisfactory for we are still making them.

"Since then, we have used Republic ENDURO for many applications, including restaurant equipment, dental fixtures, table tops, chemical laboratory parts and others.

"To me, the most important angle of this stainless steel business is the fact that it will be used in the future even more extensively than it is today. It seems to me that every tinner should think about this. We hope that the day will come when all the work in our shop will be on Republic ENDURO Stainless Steel.

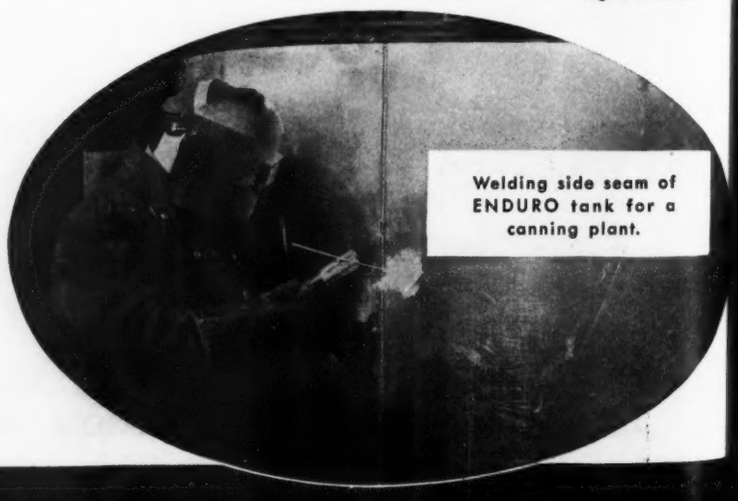
"Why shouldn't we? Stainless steel has helped to establish A. H. Lumm Co. as quality tinners and fabricators and, what is more important, has really put us on the right side of the ledger."

REPUBLIC STEEL CORPORATION

Alloy Steel Division, Massillon, Ohio • General Offices, Cleveland, Ohio

BERGER MANUFACTURING DIVISION • CULVERT DIVISION • NILES STEEL PRODUCTS DIVISION
STEEL AND TUBES DIVISION • UNION DRAWN STEEL DIVISION • TRUSCON STEEL COMPANY

*Reg. U. S. Pat Off.



Welding side seam of ENDURO tank for a canning plant.

REPUBLIC *Enduro* STAINLESS STEEL

Vol. 110 American Artisan No. 4

Honesty Is Needed in the Attic Fan Field

PLANS are under way already, reports indicate, to make the coming summer one of the most active selling seasons the attic fan field has yet seen. Established attic fan manufacturers have been actively setting up dealer outlets; manufacturers who have not previously offered attic fans are now ready to do so; electric utilities active in former years in attic fan promotion are all set to repeat on an even larger scale; utilities which have not previously been active are announcing plans for intensive drives to popularize "poor man's cooling."

We have learned much about this method of obtaining summer comfort at low cost since the Engineering Experiment Station at the University of Illinois reported its first attic fan results following the summer of 1933. Most important, perhaps, is the fact that those 1933 conclusions have been proved by the sale and installation of scores of thousands of attic fans.

The second important fact learned is that no installation is one whit better than the fan selected and the efficiency of the installation.

What Makes a Successful Installation

To be successful, the fan must move large quantities of air. To be satisfactory to the owner the fan must move these large air quantities in silence.

Quantity, with silence, is, then, the prime requisite of any night air cooling or attic fan system. This is a simple and easily understood formula. But there have been, sad to relate, many, many intallations which do not meet this simple formula.

There have been many installations made where the fan does not actually move the air quantities on which the system was sold and designed. Some of these unsatisfactory installations have resulted from the sale of a fan too small to do the job in order to reduce the selling price of the installation a few dollars.

But a more serious failure has come from the installation of fans which the manufacturer "said" had a certain capacity when, in service, that fan was basically unable to deliver its rated capacity. In these cases the contractor was "way out on the limb;" he had taken the manufacturer's word for the rating; he had no accurate way to check that rating; his installation was not satisfactory to the customer and his only remedy was to remove the fan and install another larger size.

We have had enough experience with fans by now to know that when the fan is installed according to established practice, the resistance of the installation is within the limits of any good fan. If the fan does not move its rated capacity, there is something wrong with that fan's design or it has been knowingly over-rated.

A Lesson from Furnace Blower Experience

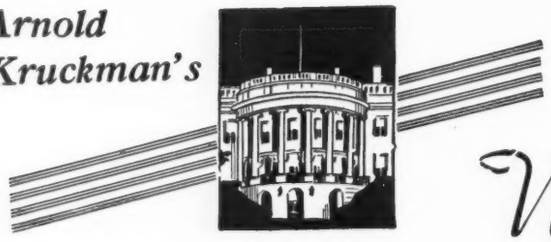
The warm air heating industry went all through the sad experience of over-rated equipment several years ago. The contractors solved the problem by refusing to buy fans or blowers from manufacturers who were careless in their ratings or were unethical enough to over-rate their units. Quite likely attic fan dealers will have to solve their problem of under-delivery in the same manner—by refusing to buy products which do not or cannot meet the makers' published ratings.

Silence in operation, which every customer demands, is obtained from two well known requisites. First of all, the fan itself must be quiet. Quietness, in a fan, is a matter of proper fan design. The manufacturer can insure quiet operation if he observes certain long established engineering principles. Violation of these principles can only come from disinterestedness or selfishness—disinterest as to what the fan does after installation and selfish interest in making the immediate sale, hoping to catch another sucker tomorrow.

The remedy for these fly-by-night practices also

(*Continued on page* 120)

Arnold Kruckman's



Washington Letter

Sheet Metal Specialties Needed By Rearmament

BROADLY speaking, camp building, defense housing and plant expansion are expected to slow down. The *initial* phase of this part of the great defense program has come to its climax. This applies especially to Army activities. There is still a sizable volume of Navy work to be done. Navy still has housing to build and it still has unbuilt barracks, air bases, naval bases, submarine bases and similar huge systems of communities on the North American continent; and off the continent, in the Pacific, the Caribbean, and the Atlantic.

Navy Wants Work Subcontracted

The Navy people in Washington think there is tremendous work for the readers of AMERICAN ARTISAN still to be secured by getting the details from the prime contractors whose identities may be had from the Navy Bureau of Supplies and Accounts. The locations of local offices of the Bureau of Supplies and Accounts have been published in these columns; if you find it difficult to consult back numbers, you can always find out where to reach the nearest Navy office by getting in touch with some Federal office in your nearest Post Office or U. S. Federal Building. Often the specific Navy offices are listed in telephone directories. You may also obtain details about these construction jobs by consulting the people in the Federal Defense Contract Service bureaus which have been established in 36 different cities of the United States. The location of these bureaus will be listed later in this letter.

These Defense Contract Service bureaus have been established specifically to bring the subcontractor into the picture. The Service is an activity of Mr. Knudsen's Office of Production Management. It is particularly under the wing of John D. Biggers, next in command in the OPM. The literal purpose of the Government is to spread the work into every basement or back alley that has a shop. The object is to spread the work and to pile up working hours. Every machine and every worker, capable of producing anything, is to be kept busy as many hours daily as the men and the machines can work.

Time Is All-Important

The keynote of the program is contained in the significant statement: "Time is not available to permit careful planning for really complete utilization of industrial equipment." This means, clearly, that in place of careful planning, the object now is to put to work everything and everybody having facility and skill. The idea is to make living and real the first Mr. Armour's slogan: "Do It Now!" Washington holds as fundamental that there never was a period in history when Time was more of the essence than it is at this instant moment. They call the battle in America the Battle of Time.

Lend-Lease Will Prolong Boom

The outpouring of Lend-Lease funds is expected to take up the slack in plant expansion when the present production program begins to level out. Every prime business at this moment has a huge backlog of orders it cannot even begin to touch, and later it will receive still more orders from the Lend-Lease source. The momentum of this business is expected to continue at top speed for many months.

Meantime it will be necessary to *plan* new expansion of plant facilities and of housing. They tell you here that during the first phase they were obliged to place the orders where there are going plants because we could not wait to create new plants and new communities. But the next shoal of plants and housing are to be taken more widely out into the country, into the regions where there are concentrated reserves of labor and of materials and facilities. That obviously means the birth of new industrial communities in all parts of the country.

"Farming" Subcontracts Encouraged

The next development of defense industrial communities will be more in keeping with the strategical plans of the military. Plants will be placed where they will fit into the general plan for complete total mobilization of the people back home to produce for the people in the field who do the fighting. In case of absolute War the pressure for speed in production will undoubtedly develop into some form of compulsory response by the civilians.

Even now the din for speed that comes from OPM and other defense agencies reflects the increasing pressure the military are putting on prime contractors. This is where the drive stems from to force prime contractors of everything to farm-out or sublet work until it hurts. As soon as the present log-jam of orders begins to move with real speed there are more new orders waiting for the prime contractors. Make room, make way, for more contracts, by spreading your work as widely and quickly as possible among subcontractors, is the insistent pressure of Army and Navy.

Where to Get Subcontracts

It is the job of the Defense Contract Service to secure this spread by acting as broker between the subcontractor and the prime contractor. If you can think of anything you can make under a subcon-

tract, no matter how meager your resources, or how meager you think your experience may be, go to the nearest bank and ask them to tell you where you can find the nearest Federal Reserve Bank or Federal Reserve Bank Branch. There are seven regional offices. Frank H. Neely, head of Rich's Department Store, is in charge in Atlanta. Raymond C. Force, head of the Caterpillar Tractor Company, is in charge at San Francisco. Albert M. Creighton, of the Boston Woven Hose and Rubber Compny, is coordinator for the New England region at Boston. George C. Brainard, head of General Fireproofing Company, has charge in Cleveland. R. B. Shepard, of Finch, Van Slyck & McConville, is in charge at Minneapolis. Clarence W. Avery, of the Murray Corporation of America, is in charge at Detroit. Dr. Thomas S. Gates, president, University of Pennsylvania, is in charge in Philadelphia.

Defense Contract Service

Aside from the local staff offices at the Federal Reserve Bank in each of the cities named, the Defense Contract Service also maintains staffs at the Federal Reserve Banks or Federal Reserve branch banks at New York City, Buffalo, Cincinnati, Pittsburgh, Richmond, Baltimore, Charlotte (N. C.), Birmingham, Jacksonville (Fla.), Nashville, New Orleans, Chicago, St. Louis, Little Rock, Louisville, Memphis, Helena (Mont.), Kansas City, Denver, Oklahoma City, Dallas, El Paso, Houston, San Antonio, Los Angeles, Portland (Ore.), Salt Lake City, and Seattle.

Offices Are Staffed to Help You

In each of these offices there is a manager and an assistant manager, with a staff ranging from 8 to 12 persons, including technologists, engineers, industrial experts, lawyers, production men, and men who know plant conversion and who know how to counsel you where to get money, where to get technical help and who have complete lists of all prime contracts and prime contractors in their area and know about the contracts as soon as they are made. They have studied these contracts right on the spot and they know the details that are involved. They can tell you where there is need for the subassemblies you can produce and they will help you to plan to give the service and help you to get the subcontracts.

Here in Washington they are especially emphatic in stressing the fact that the presence of the Defense Contract Service in the Federal Reserve Bank quarters does not signify that you will encounter the pontifical banking impersonality when you go there to do business. They aim to get on just as personal a basis with you as you wish. They keep constantly current card records of all human and industrial resources in their areas. After you have established personal relations it is expected you will keep the acquaintance actively alive. They give you a series of questions to answer so they may know what facilities you offer. Here are a typical series of questions:

Have This Information Ready

How many people do you employe? How many persons can you employe on a 1 shift 2 shift or 3 shift basis? Is the labor supply sufficient in your vicinity for capacity operation? Do you have a design and development department? What are the types of products you make now, or that you have made in the past? To what tolerances are these products held? How many shifts are now working in your plant and what is the length of each shift? Please list each of your machines by type, size, manufacturers' name, manufacturers' serial number, the year the machine was built, and tolerances to which each machine will work. How many machine hours do you have idle per week over and above your present commitments? (This information should be broken down by types of machine.) What is your financial rating? Is your power supply adequate? What are your shipping facilities? Who are your regular customers? Have you ever been a subcontractor, and if so, for whom? Have you ever subcontracted any of your work and to whom?

Subcontractors Work for Government

The Defense Contract people wish to make clear that the subcontractor will be working for the Government practically in the same sense as the prime contractor. It is true the subcontractor gets his direct order from the prime contractor. And in the same manner the subcontractor is expected to make his arrangements for subservice with other subcontractors. You may gather from this suggestion that the Defense Contract people visualize this subcontracting picture as a series of subcontracting relations. There may be three, four, even as many as a half dozen different grades of subcontractors. One subcontractor will serve the other. Eventually, thus, the man in the basement or the back alley or in the garage will get the detail work in keeping with the capacities of his facilities. It is quite possible that some of him will work in groups by pooling facilities and receiving orders and contracts as pools. Under Morris Cook some of these pool arrangements have already been put in operation in Virginia. As a matter of patriotic helpfulness several men in the Shenandoah Valley located skilled men with meager facilities, but with individualistic initiative and organized them into a working pool. Collectively it is said they are immensely useful in producing many of the thousands of smaller supplies that are urgently needed immediately.

Gov't. a Party in All Contracts

It is obvious the Defense Contract Service participation in organizing the spread of the subcontracts puts the Government immediately in the chain of sequence as a part of the business unity. In some instances the subcontractor is recognized by the Government with a direct subcontract approved formally by the Government. In others the contract between the prime contractor and the subcontractor is scrutinized by the Government agency at interest. In all cases the Defense Contract Service is tacitly a party because it frequently makes the form of the contract and always has some recorded knowledge of the transaction.

Material Shortage Expected

But further than that, even, contracts and subcontracts naturally depend upon the priority ratings that govern the supply of materials, tools, labor, transportation and other materials and facilities that eventually must come under priority rationing. In the end no manufacturer, no matter how small, will be able to secure materials and service and facilities unless he shows that his production does not interfere with national defense work. It is foreseen, in order to secure

(*Continued on page* 121)

	Federal	%	State & Local	%	Combined	%
Pay Roll Taxes...	$ 740,000,000	13	$ 794,000,000	21	$1,534,000,000	17
Gasoline & Motor Vehicles	247,000,000	5	1,185,000,000	31	1,432,000,000	15
Sales Taxes	None	..	440,000,000	11	440,000,000	5
Personal & Business Taxes.....	2,403,000,000	44	861,000,000	23	3,264,000,000	35
All Other Taxes..	2,095,000,000	38	573,000,000	14	2,668,000,000	28
Totals	$5,485,000,000	100	$3,853,000,000	100	$9,338,000,000	100

America's Tax Bill

By J. G. Dingle
C.P.A., Ottawa, Ill.

The tax "take" figures shown in the box above were released late last year and cover tax payments for the 1939 government fiscal year (not calendar year). The breakdown and relationships probably hold true for 1940 figures to be released this coming summer. The chief point of interest is the amount collected from taxes we think of as "new"—especially taxes which affect every man in business. These taxes are mounting—the business man must hereafter be absolutely certain that he recovers this increasing burden of taxes in his overhead figures.

Who paid it? 130,000,000 American Men, Women and Children—at an average per person of $71.75.

Pay roll taxes—unknown before the New Deal—Furnish 13% of the Federal Taxes; 21% of the State and Local, or 17% of the combined total. *Who really paid these taxes?* The regularly employed workers. *Who gets the benefits?* The government "pay rollers" and the seldom or irregularly employed workers, and those over 65.

Gasoline and motor vehicle taxes—5% of the Federal; 31% of the State and Local; or 15% of the combined total. *Who paid these taxes?* The owners of motor vehicles, both those used for pleasure and those used for business. *Where does it go?* Some for good roads; the rest down many rat holes. The motor vehicle long ago ceased to be an expensive toy and has taken its place as a vital necessity; yet is taxed as a luxury.

Sales taxes— 11% of the State; no Federal AS YET, or 5% of the combined total.

Who paid these taxes? The consumers of the necessities of life; the man whose income barely covers the cost of living, pays more in proportion to his income than does the man of greater income. Only tangible goods to consumers are taxed here.

Personal & business taxes— 44% of the Federal; 23% of the State and Local; or 35% of the combined total. *Who paid these taxes?* The business man paid them in the first instance, recovering them, however, in the price of the goods sold. In the end, the consumer paid these taxes, as well as all other taxes. *If you work for your living, you are in business; what hurts business, hurts you.*

You, Mr. Consumer, pay the cost of government. When government destroys your job by taxing it to death, you suffer. When government gets seventeen cents out of each dollar of its revenue from taxes on pay rolls, business must, of necessity suffer, until it finds some way to reduce labor content in its product. The Social Security Taxes really penalize the steadily employed workers for the benefit of those who, for any reason, are unable to hold a steady job. This kills individual initiative, and ultimately all will be seeking a place on the government dole. Why work when you can live without it? America was not made by such ambitions.

AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING

SECTION

DEVOTED TO HOME AND SMALL COMMERCIAL AIR CONDITIONING

Theme Song for a Service Man

There's a New Leader in the Control Field

Actual field experience from all parts of the country has proved that Perfex Controls require so much less service attention after installation that the whole automatic heating industry—manufacturers, dealers and the service men themselves—can agree on giving the laurels of leadership to this comparatively young line of products.

We can be entirely sincere, therefore, in suggesting Tosti's famous composition as a theme song for service men who whistle while they work at installations of Perfex Twin Contact Controls, because it will be rare indeed to have control failure bring them back to that job.

Sound engineering, rigid manufacturing supervision, and a basic conception by the makers that controls are integral parts of the heating system and not individual accessories to be considered separately—these are the reasons for Perfex leadership, because they are the reasons for Perfex performance.

PERFEX CORPORATION

500 W. Oklahoma Avenue, Milwaukee, Wis.

Twin Contact Controls

Cooling System for a Bowling Alley

HYDER'S ALLEYS, Minneapolis, a popular bowling parlor, is cooled for the comfort of patrons in the summer with a 7½ hp compressor system designed and installed by the Beldon-Porter Company, local Frigidaire distributors.

The system is interesting because the 16,800 cubic foot space is cooled 15 degrees (95 deg. outside to 80 deg. inside) with about 7½ tons capacity and the cooling effect is concentrated behind and a very short distance in front of the foul line.

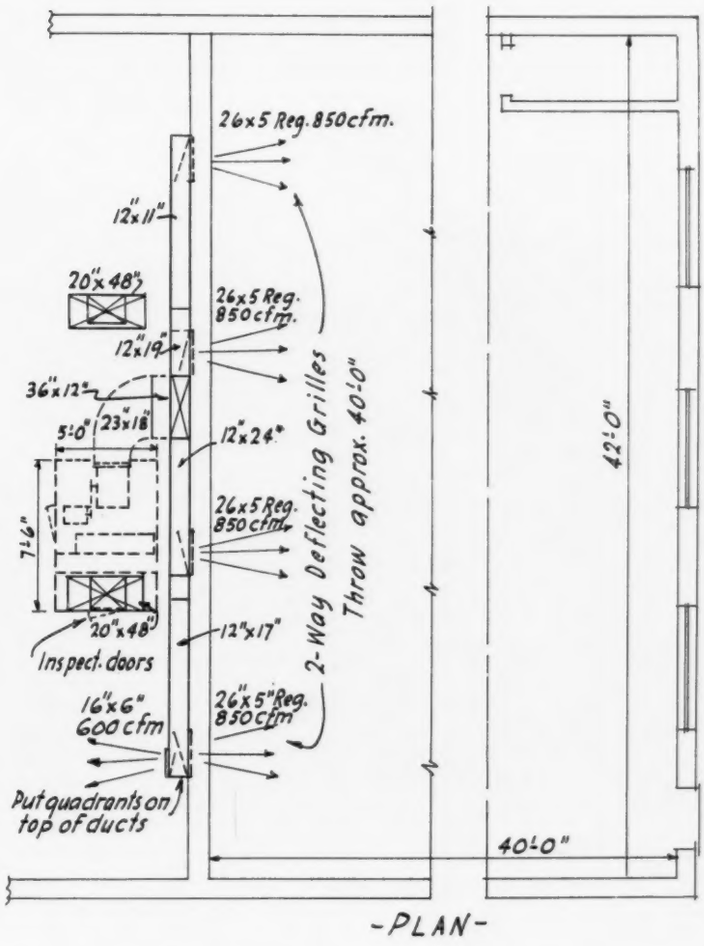
The arrangement of equipment and ducts is indicated in the drawings. The compressor is in the basement; the fan, coils, and motor are placed on the roof in a special compact housing. The only part of the system which shows, or occupies space is the shallow supply duct, the supply grilles and the exhaust opening grilles. (See elevation).

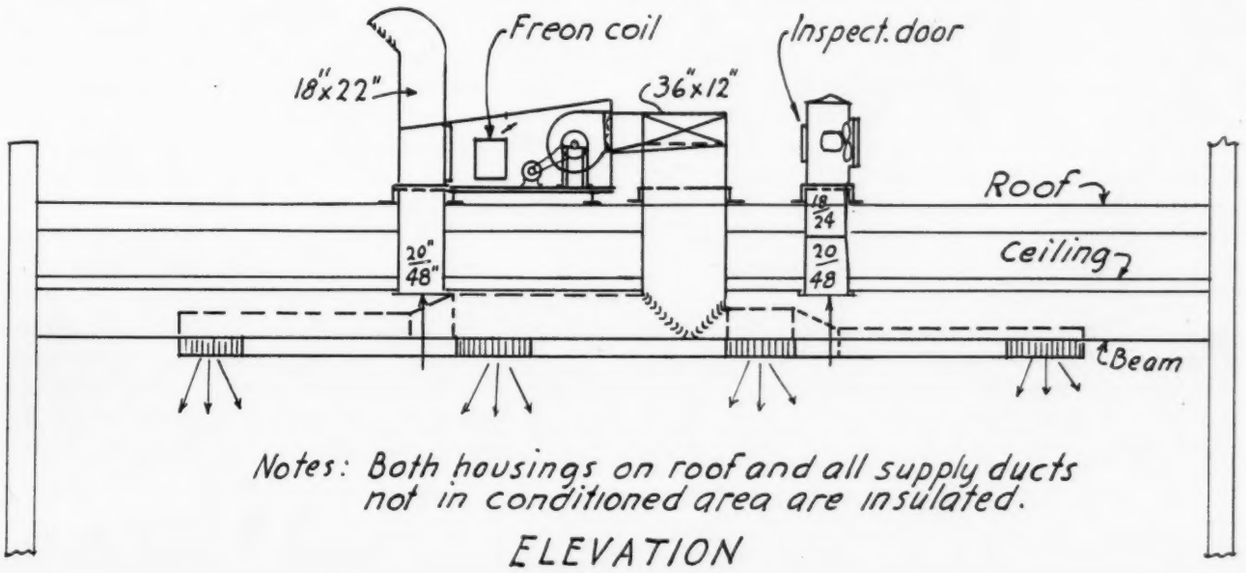
In operation for cooling, 4,000 cubic feet of air are introduced as shown—3,400 cfm through four grilles above and just behind the foul line and 600 cfm toward the entrance, service counter, etc. The air over the center of the alleys and at the pins is not disturbed or cooled by the system. A separate exhaust fan changes the air over the pins, but does not cool.

A manual adjustment is provided so that recirculated and outside air can be proportioned as needed. Under severe conditions about 60 percent recirculated and 40 percent outside air provides economical cooling with complete removal of all smoke, odors, etc. The system can be set for 100 percent outside air when outdoor conditions make possible cooling and ventilating by air circulation only. The compressor and coils are sized to obtain 80 deg. D. B. with 50 percent R. H. when outdoor conditions are 95 deg. D. B. and 75 percent R. H.

The exhaust system consists of a 3,000 cfm propeller fan placed in a pent house directly above the exhaust grille (see elevation) and a gravity ventilator with storm hood as shown. The fan

(*Continued on page* 129)





HEATING CONTR. Allweather Conditioning Co. OWNER L. M. Hurden DATE 11-15-40

ADDRESS ADDRESS 712 Powhatan Dr

CITY Chicago, Ill. CITY Edgebrook, Ill

EQUIPMENT 20" A. C. Unit FUEL Coal TEMP. DIFF. 80 REGISTER LOC. Base DESIGN TEMP. 145 BONNET TEMP. 150

Room / Dimensions	Cubical Cont.	Crackage 39.3	Exp Wall	Glass 1.13	Net Wall .19	Exp Floor .08	Exp Ceil. .08	Attic Wall .22	B.T.U. Per Deg. T.D.	Equiv. Length	Reg. Temp. C.F.M.	Rnd. Pipe Corr.	Rect. Duct	Vel. Reg.	Equiv. Length	Rnd. Pipe Corr.	Rect. Duct	Vel. Reg.
Living 21⅝×13⅝×9	2673	39 / 27	49 441	49 / 55	393 / 75	297 / 24	42 / 3	—	185 / 93	37+15 / 18	150 / 93	6.7 / 4.9	10×3	350 / 10×6	50	6.7 / 5.9	8×3½	300 / 14×5
Kitchen 12⅝×9⅝×9	1069	40 / 28	25 225	38 / 43	187 / 36	119 / 10		—	117	21+35 / 56	145 / 124	7.4 / 6.7	12×3¼	600 / 12×4		—	—	—
Dining 12⅝×11⅛×9	1294	19 / 13	24 216	24 / 28	192 / 37	144 / 12	36 / 3	—	93	17+35 / 52	145 / 99	6.8 / 6.0	10×3¼	350 / 10×6	70	9.2 / 8.6	14×4½	350 / 30×5
Vestibule 5⅝×5⅝×9	272	21 / 15	5⅝ 50	19 / 22	31 / 6	30 / 2	18 / 1	—	46 / 11 / 57	22+35 / 57	145 / 60	5.6 / 5.1	10×3	275 / 10×5	65	6.8 / 6.3	12×3	300 / 14×5
		—	—	—	—	—	—	—			—	—		—		—	—	—
Bedroom #1 15⅝×13⅝×8	1728	26 / 19	21-168 23-184	27 / 30	150 / 28	—	216 / 17	176 / 39	132	29+35 / 64	140 / 149	7.9 / 7.3	14×3½	350 / 14×6	55	7.9 / 7.1	14×3¼	475 / 14×5
Bath 7×5×8	280	13 / 9	7-56 5-40	7 / 8	49 / 9	—	35 / 3	40 / 9	38	29+55 / 84	140 / 44	5.0 / 4.9	10×3	200 / 10×5		—	—	—
Bedroom #2 12⅝×12⅝×8	1250	18 / 13	12½-100 17-136	18 / 20	91 / 17	—	156 / 13	127 / 28	91	33+55 / 88	140 / 102	6.9 / 6.8	12×3¼	300 / 12×6	75	7.8 / 7.5	14×3½	475 / 14×5
Hall 5⅝×5×8	220	—	5⅝ 44	—	44 / 9	—	28 / 2	—	11		—	—		—		—	—	—
		—		—	—	—	—	—			—	—		—		—	—	—
Living		—		—	—	—	—	—	92	23+35 / 58	145 / 98	6.8 / 6.2	10×3¼	350 / 10×6	70	6.7 / 6.3	12×3	300 / 14×5
TOTALS	8786	124		206	217	48	42	76	713		769							

B.T.U. Per Deg T.D. 713 × T. D. 80 = Total B.T.U. 57,040

Fig. 1—Data sheet completely filled in with all calculations made as suggested in the Technical Code. Text explains how registers are sized, selected and the return system calculated.

Technical Code—*Precalculated* [Part 6]

By Henry Aronson

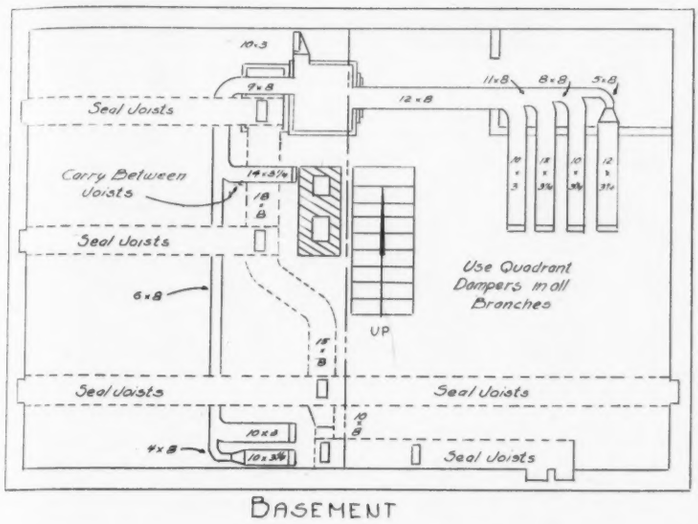
Field Engineer, Premier Furnace Co.

THIS article will complete the data sheet, Fig. 1, and the heating plan, Fig. 2. Taking up where the last article left off, the first step is to size the registers. For this entry, any standard register catalogue may be referred to. The width of the wall stack ordinarily determines the width of the register and the height is determined by the velocity desired.

Perhaps it should be mentioned here that the register size is the determining factor as far as velocity is concerned, and is independent of the velocities carried through the duct system. The action is somewhat similar to the action of a garden hose nozzle—as the size of the opening is reduced, the velocity, *and the resistance*, is increased.

According to article 6, item r of the Technical Code, velocities through baseboard, or above baseboard, registers, should not exceed 300 feet per minute. With short throws, such as are found in the house being figured, velocities are not vital. Under certain conditions register locations and velocities are of major importance, but this phase of design could fill a book all by itself. Most register companies give reasonably complete information and their recommendations should be followed. With the newer type deflecting registers, comparatively high velocities can be used without causing drafts. The writer prefers velocities higher than those recommended by the code and ordinarily figures velocities between 300 and 350 feet per minute. It will be seen that some of the velocities shown on the data sheet are as high as 350 feet per minute.

In this particular case, sizing registers for 300 feet per minute with the make of register the writer based his figures on, would run into what the writer considers objectionable sizes. Either they would be wider than the wall stack specified, which would necessitate a special head or using larger wall stack, or it would be necessary to use a register with a low aspect ratio (width to



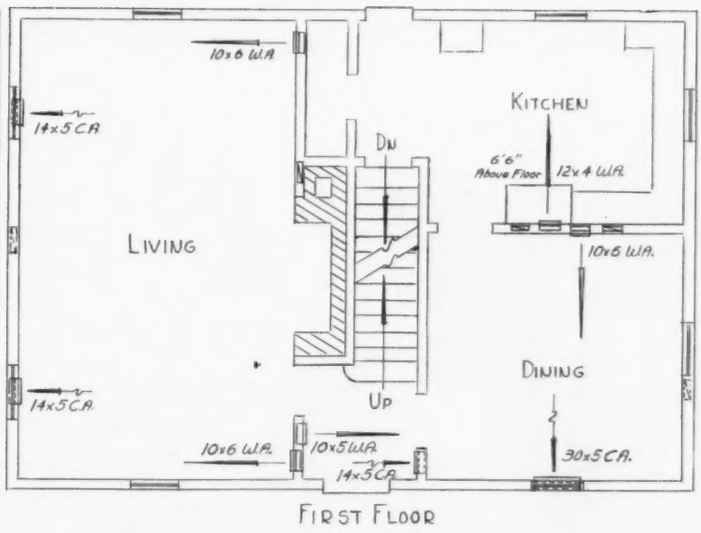


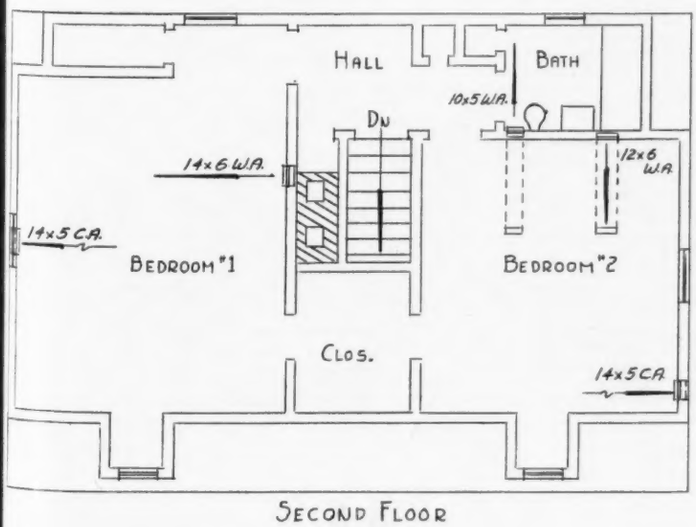
Fig. 2A (Basement), 2B (First Floor) and, below, 2C (Second Floor) of the typical house for which a system was engineered. On these plans the register sizes are indicated as selected in the text.

height).

In actual practice it is best to keep aspect ratios to a maximum of 2 to 1 wherever possible. With registers that have too much height, the air is delivered only from the upper part of the register face, so the estimated velocities would be fictitious. This does not apply to some of the newer types of registers, but with this type a higher velocity is not objectionable. Obviously designers are faced with the problem of using registers of standard size and of a size that can be installed without extra work.

High Wall Register Velocities

Where high wall registers are used, minimum velocities from 500 to 600 feet per minute should be used. Such velocities are very important for high wall registers, as low velocities are apt to cause dirt streaks on the ceiling and drafts. It is for this reason the writer does not recommend two-speed blowers or modulating dampers where high registers are in use. As the grille in the Kitchen is high, it is sized for 600 feet per minute velocity. With exceptionally long throws, even higher velocities may be necessary.



Pick Register Sizes from Catalog

An explanation on how to obtain register sizes would be superfluous, as it is simply a matter of looking at the table in the register catalogue and finding the size that will deliver approximately the CFM shown in the CFM column of the data sheet, at as close to the desired velocity as possible. Using standard sized registers, velocities will seldom be exactly those desired. This applies to both supply and return registers. The velocities of the return grilles is comparatively unimportant, and the code does not make any specific recommendations. For practical purposes return velocities should not exceed 500 feet per minute. When the register sizes have been found, they should be entered in the Vel./Reg. column of the data sheet.

Register catalogues do not, as a rule, provide a very close table of velocities at various capacities. However, the designer should be able to estimate them fairly closely from the data given. Of course it is possible to work them out accurately from the free area figures which are always given in the register tables, but for practical purposes this is unnecessary. The only purpose served by showing velocities at all is in tentatively balancing the job when balancing is done with the aid of instruments for determining air delivery. The writer's experience has been that it is practically impossible to obtain a really accurate velocity reading from a register face under average field conditions. Where the jobs are not balanced in this manner, it is unnecessary to estimate individual velocities at all. Where they are to be used, they should be entered in the Vel./Reg. column.

Supplementary Tables

(To accompany articles on establishing Heat Losses)

CUBICAL CONTENTS, ROOMS WITH 7½ FT. CEILINGS

	5	5½	6	6½	7	7½	8	8½	9	9½	10	10½	11	11½	12	12½	13	13½	14	14½	15	16	17	18	19	20
5	188																									
5½	206	227																								
6	225	247	270																							
6½	243	268	292	317																						
7	262	289	315	341	367																					
7½	281	309	337	366	394	422																				
8	300	330	360	390	420	450	480																			
8½	319	351	383	415	446	478	510	542																		
9	338	371	405	439	472	506	540	574	607																	
9½	356	392	428	464	499	534	570	606	641	677																
10	375	413	450	488	525	562	600	638	675	712	750															
10½	394	433	473	512	551	591	630	670	709	748	788	827														
11	413	454	495	536	577	619	660	702	743	784	825	867	907													
11½	431	474	518	561	604	647	690	734	776	819	863	906	949	992												
12	450	495	540	585	630	675	720	765	810	855	900	945	990	1035	1080											
12½	469	516	563	610	656	703	750	797	844	891	938	985	1031	1078	1125	1172										
13	488	536	585	634	682	731	780	829	877	926	975	1024	1072	1121	1170	1219	1267									
13½	506	557	608	659	709	759	810	861	911	962	1013	1063	1114	1164	1215	1266	1316	1367								
14	525	578	630	683	735	789	840	893	945	997	1050	1103	1155	1207	1260	1313	1365	1418	1470							
14½	544	598	653	707	761	816	870	925	979	1033	1088	1142	1196	1250	1305	1360	1414	1468	1523	1577						
15	563	619	675	731	787	844	900	957	1012	1068	1125	1182	1237	1294	1350	1406	1462	1519	1575	1631	1687					
16	600	660	720	780	840	900	960	1020	1080	1140	1200	1260	1320	1380	1440	1500	1560	1620	1680	1740	1800	1920				
17	638	701	765	829	892	956	1020	1084	1147	1211	1275	1339	1402	1466	1530	1594	1657	1721	1785	1849	1912	2040	2167			
18	675	743	810	878	945	1012	1080	1148	1215	1282	1350	1418	1485	1552	1620	1688	1755	1823	1890	1958	2025	2160	2295	2430		
19	713	784	855	926	997	1069	1140	1212	1282	1353	1425	1497	1567	1639	1710	1781	1852	1924	1995	2066	2137	2280	2422	2565	2707	
20	750	825	900	975	1050	1125	1200	1275	1350	1425	1500	1575	1650	1725	1800	1875	1950	2025	2100	2175	2250	2400	2550	2700	2850	3000
21	788	867	945	1024	1102	1181	1260	1339	1417	1496	1575	1654	1732	1811	1890	1969	2047	2126	2205	2284	2362	2520	2677	2835	2992	3150
22	825	908	990	1073	1155	1237	1320	1403	1485	1567	1650	1733	1815	1897	1980	2063	2145	2228	2310	2393	2475	2640	2805	2970	3135	3300
23	863	949	1035	1121	1207	1294	1380	1467	1552	1638	1725	1812	1897	1983	2070	2156	2242	2328	2415	2501	2587	2760	2932	3105	3278	3450
24	900	990	1080	1170	1260	1350	1440	1530	1620	1710	1800	1890	1980	2070	2160	2250	2340	2430	2520	2610	2700	2880	3060	3240	3420	3600
25	938	1032	1125	1219	1312	1406	1500	1594	1687	1781	1875	1969	2062	2156	2250	2344	2437	2531	2625	2719	2812	3000	3187	3375	3562	3750
26	975	1073	1170	1268	1365	1462	1560	1658	1755	1852	1950	2048	2145	2242	2340	2438	2535	2633	2730	2829	2925	3120	3315	3510	3705	3900
27	1013	1114	1215	1317	1417	1518	1620	1722	1822	1923	2025	2127	2227	2328	2430	2531	2632	2734	2835	2936	3037	3240	3442	3645	3847	4050
28	1050	1155	1260	1365	1470	1575	1680	1785	1890	1995	2100	2205	2310	2415	2520	2625	2730	2835	2940	3045	3150	3360	3570	3780	3990	4200
29	1088	1196	1305	1414	1522	1631	1740	1849	1951	2066	2175	2284	2392	2501	2610	2719	2827	2936	3045	3154	3262	3480	3697	3915	4132	4350
30	1125	1238	1350	1463	1575	1687	1800	1913	2025	2138	2250	2363	2475	2588	2700	2813	2925	3037	3150	3263	3375	3600	3825	4050	4275	4500

CUBICAL CONTENTS, ROOMS WITH 8½ FT. CEILINGS

	5	5½	6	6½	7	7½	8	8½	9	9½	10	10½	11	11½	12	12½	13	13½	14	14½	15	16	17	18	19	20
5	212																									
5½	234	257																								
6	255	281	306																							
6½	276	304	332	359																						
7	298	327	357	387	417																					
7½	319	351	383	414	446	478																				
8	340	374	408	442	476	510	544																			
8½	361	397	434	470	506	542	578	614																		
9	383	421	459	497	536	574	612	650	689																	
9½	404	444	485	525	565	606	646	686	727	767																
10	425	468	510	553	595	638	680	723	765	808	850															
10½	446	491	536	580	625	669	714	759	803	848	893	937														
11	468	514	561	608	655	701	748	795	842	888	935	982	1029													
11½	489	538	587	635	684	733	782	831	880	929	978	1026	1075	1124												
12	510	561	612	663	714	765	816	867	918	969	1020	1071	1122	1173	1224											
12½	531	584	638	691	744	797	850	903	956	1009	1063	1116	1169	1222	1275	1328										
13	553	608	663	718	774	829	884	939	995	1050	1105	1160	1216	1271	1326	1381	1437									
13½	574	631	689	746	803	861	918	975	1033	1090	1148	1205	1262	1320	1377	1434	1492	1549								
14	595	655	714	774	833	893	952	1012	1071	1131	1190	1250	1309	1369	1428	1488	1547	1607	1666							
14½	616	678	740	801	863	924	986	1048	1109	1171	1233	1294	1356	1418	1479	1541	1602	1664	1726	1787						
15	638	701	765	829	893	956	1020	1084	1148	1211	1275	1339	1403	1466	1530	1594	1658	1721	1785	1849	1913					
16	680	748	816	884	952	1020	1088	1156	1224	1292	1360	1428	1496	1564	1632	1700	1768	1836	1904	1972	2040	2176				
17	722	795	867	939	1012	1084	1156	1228	1301	1373	1445	1517	1590	1662	1734	1806	1879	1951	2023	2095	2168	2312	2457			
18	765	842	918	995	1071	1148	1224	1301	1377	1454	1530	1607	1683	1760	1836	1913	1989	2066	2142	2219	2295	2448	2601	2754		
19	807	888	969	1050	1131	1211	1292	1373	1454	1534	1615	1696	1777	1857	1938	2019	2100	2180	2261	2342	2423	2584	2745	2907	3069	
20	850	935	1020	1105	1190	1275	1360	1445	1530	1615	1700	1785	1870	1955	2040	2125	2210	2295	2380	2465	2550	2720	2890	3060	3230	3400
21	893	982	1071	1160	1250	1339	1428	1517	1607	1695	1785	1874	1964	2053	2142	2231	2321	2410	2499	2588	2678	2856	3034	3213	3392	3570
22	935	1029	1122	1216	1309	1403	1496	1590	1683	1777	1870	1964	2057	2151	2244	2338	2431	2525	2618	2712	2805	2992	3179	3366	3553	3740
23	978	1075	1173	1271	1369	1466	1564	1662	1760	1857	1955	2053	2151	2248	2346	2444	2542	2639	2737	2835	2933	3128	3323	3519	3715	3910
24	1020	1122	1224	1326	1428	1530	1632	1734	1836	1938	2040	2142	2244	2346	2448	2550	2652	2754	2856	2958	3060	3264	3468	3672	3876	4080
25	1063	1169	1275	1381	1488	1594	1700	1806	1913	2019	2125	2231	2338	2444	2550	2656	2763	2869	2975	3081	3188	3400	3612	3825	4038	4250
26	1105	1216	1326	1437	1547	1658	1768	1879	1989	2100	2210	2321	2431	2542	2652	2763	2873	2984	3094	3205	3315	3536	3757	3978	4199	4420
27	1148	1262	1377	1492	1607	1721	1836	1951	2066	2180	2295	2410	2525	2639	2754	2869	2984	3098	3213	3328	3443	3672	3902	4131	4361	4590
28	1190	1309	1428	1547	1666	1785	1904	2023	2142	2261	2380	2499	2618	2737	2856	2975	3094	3213	3332	3451	3570	3808	4046	4284	4522	4760
29	1233	1356	1479	1602	1726	1849	1972	2095	2219	2342	2465	2588	2712	2835	2958	3081	3205	3328	3451	3574	3698	3944	4190	4437	4684	4930
30	1275	1403	1530	1658	1785	1913	2040	2168	2295	2423	2550	2678	2805	2933	3060	3188	3315	3443	3570	3698	3825	4080	4335	4590	4845	5100

Balancing the Job in the Summer

Jobs are often finished prior to the start of the heating season, and if register deliveries are reasonably well balanced with anemometers or similar instruments, it will usually be sufficient in the ordinary residence. As the density of air is greater when the furnace is not fired, the tested outputs of the registers may be 5 to 10 percent less than estimated requirements, or a later adjustment may be made by varying the fan speed. In some cases it will be found that actual requirements differ a great deal from those that have been calculated, but even so, the settings offer a good starting point for a final balance. The main requisite is that the various register deliveries approximate the proper proportions to each other.

Too Small Furnaces Need Too Much Firing

For furnace and fan capacities, the manufacturer's ratings should be used. In this case a 20-inch, cast iron furnace and fan unit would be sufficient with excess capacity for emergencies. Few concerns furnish units smaller than this and their use is undesirable whenever a fan is used because of their small fuel capacity. It is true that the heat producing capacity is about 50 per cent greater with a fan than under gravity conditions for the same furnace, but the fuel consumption is likewise greater. The fact that with coal burning equipment, considerable space must be allowed for fuel storage, will account for the fact that automatic equipment often seems ridiculously small in relation to coal fired units of the same rating.

However, it must be brought out at this point that with a Technical Code system, or for that matter any forced air system, static pressures commonly run higher than is usually suspected, and the fan must have sufficient capacity to overcome these pressures. A great many "sick" jobs are due to the designer's failure to realize just what resistance a system can have.

How Resistance Builds Up

For example in this case there is a loss of .06 inches of water on each side of the system (refer to article 6, section 2, example 11 of the code). This is a total of .12 inches for the duct system. For a register of the design used, which is of a type in general use, although there are types with less resistance, the static loss through the register with the highest velocity is .04 inches (from the catalogue data), and the inlet loss for the return face with the highest velocity is .03 inches. This means .07 inches for register losses to be added to the .12 inches duct loss or a total of .19 inches. With a complete unit, about .05 inches may be added for partially dirty filters which makes a total of .24 inches or just about ¼ inch static pressure on a job like this one.

This is for a furnace unit where the air delivery is net, and the furnace resistance has already been taken into consideration. In addition there is apt to be additional resistance due to mechanical defects in fabrication, or miscalculation in design. Where the job is a conversion, the filter loss will be closer to .10 and the loss through the furnace casing anywhere from .05 to .15 depending on baffling and design. Most blowers develop sufficient velocity head that the inlet and outlet heads may be ignored, but with exceptionally high velocities this is often an added load.

Resistance Usually Greater Than Expected

Some readers may be surprised at a job of this size having a ¼ inch static pressure, but in actual practice the writer has tested jobs and found they were often operating at a higher pressure than this due to poor duct design. One of the most common duct losses is at the plenum takeoff.

Probably one reason the effects of this have not been as bad as might be expected is that duct capacities and most fan ratings are based on 70-degree air. When the air is heated, resistances are lowered considerably. There is also, in most cases, a conversion of part of the velocity head developed by the blower, to static pressure. All in all, however, it is necessary that these pressures be taken into consideration in sizing blowers. Every effort should be made by the designer, and the installer, to insure as little resistance as possible in the system. In the writer's experience, more unsatisfactory jobs have been caused by a lack of fan capacity than for any other reason.

This Completes the Data Sheet

When the registers have been sized and the equipment to be used has been determined, the data sheet and plan may be completed as shown. Naturally there will be a divergence of opinion as to the way the plan should be made up. As far as details of fittings, etc., are concerned, the writer believes this is largely a matter of personal opinion, as long as they follow approved practices. The major purpose of a plan of this type is to show duct and register sizes and their locations, rather than detailing ductwork.

With the data sheet and plan completed, this series of articles comes to an end with the exception of a few supplementary charts which are being published so that a complete set will be available. It is the writer's hope that the charts which have been published will be of as much help to other heating men as they have been to the writer, whether they are used in connection with the Technical Code or not.

Supplementary Tables

(To accompany articles on establishing Heat Losses)

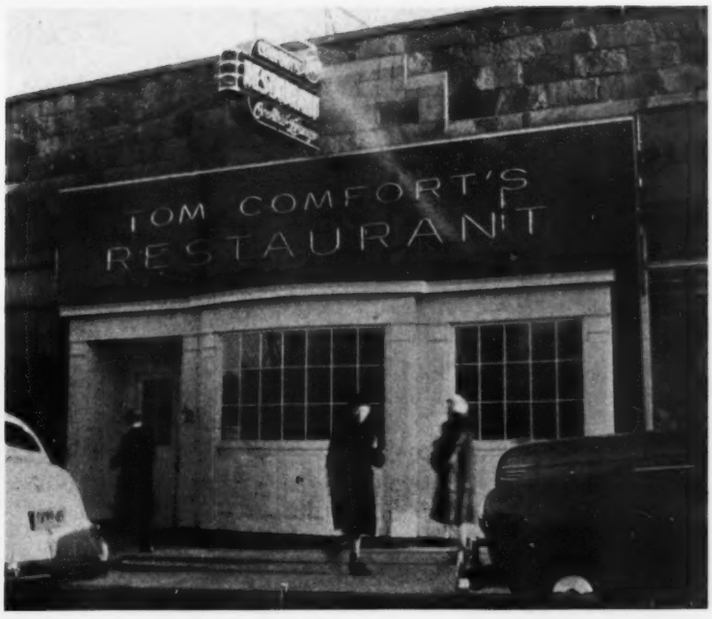
CUBICAL CONTENTS, ROOMS WITH 9½ FT. CEILINGS

	5	5½	6	6½	7	7½	8	8½	9	9½	10	10½	11	11½	12	12½	13	13½	14	14½	15	16	17	18	19	20
5	238																									
5½	261	287																								
6	285	313	342																							
6½	308	339	370	401																						
7	332	365	399	432	465																					
7½	356	392	427	463	498	534																				
8	380	418	456	494	532	570	608																			
8½	404	444	484	524	565	605	646	686																		
9	427	470	513	555	598	641	684	726	770																	
9½	451	496	541	586	632	676	722	767	812	857																
10	475	522	570	617	665	712	760	807	855	902	950															
10½	499	549	598	648	698	748	798	848	898	948	997	1047														
11	522	575	627	679	731	783	836	888	940	993	1045	1097	1149													
11½	547	601	655	710	764	819	874	928	983	1038	1092	1147	1201	1256												
12	570	627	684	741	798	855	912	969	1026	1083	1140	1197	1254	1311	1368											
12½	593	653	712	772	831	890	950	1009	1068	1128	1187	1246	1306	1365	1425	1484										
13	617	679	741	802	864	926	988	1049	1111	1173	1235	1296	1358	1420	1482	1543	1605									
13½	641	705	769	833	898	962	1026	1090	1154	1218	1282	1346	1410	1474	1539	1603	1667	1731								
14	665	731	798	864	931	997	1064	1130	1197	1263	1330	1396	1463	1529	1596	1663	1729	1795	1862							
14½	688	758	826	895	964	1033	1102	1170	1239	1308	1377	1446	1515	1584	1653	1722	1791	1860	1929	1997						
15	712	784	855	926	997	1068	1140	1211	1282	1353	1425	1496	1567	1638	1710	1781	1852	1923	1995	2066	2137					
16	760	836	912	988	1064	1140	1216	1292	1368	1444	1520	1596	1672	1748	1824	1900	1976	2052	2128	2204	2280	2432				
17	807	888	969	1049	1130	1211	1292	1373	1454	1534	1615	1695	1776	1857	1938	2019	2100	2180	2261	2342	2423	2584	2746			
18	855	940	1026	1111	1197	1282	1368	1453	1539	1624	1710	1795	1881	1966	2052	2138	2223	2309	2394	2480	2565	2736	2907	3078		
19	902	993	1083	1173	1263	1353	1444	1534	1624	1714	1805	1895	1986	2075	2166	2256	2347	2437	2527	2617	2708	2888	3069	3249	3430	
20	950	1045	1140	1235	1330	1425	1520	1615	1710	1805	1900	1995	2090	2185	2280	2375	2470	2565	2660	2755	2850	3040	3230	3420	3610	3800
21	997	1097	1197	1296	1396	1496	1596	1695	1795	1895	1995	2094	2194	2295	2394	2494	2594	2693	2793	2893	2993	3192	3392	3591	3790	3990
22	1045	1149	1254	1358	1463	1567	1672	1776	1881	1985	2090	2194	2299	2403	2508	2613	2717	2822	2926	3031	3135	3344	3553	3762	3971	4180
23	1092	1202	1311	1420	1529	1638	1748	1857	1967	2075	2185	2294	2403	2512	2622	2731	2841	2950	3059	3168	3278	3496	3715	3933	4152	4370
24	1140	1254	1368	1482	1596	1710	1824	1938	2052	2166	2280	2394	2508	2622	2736	2850	2964	3078	3192	3306	3420	3648	3876	4104	4332	4560
25	1187	1306	1425	1543	1662	1781	1900	2018	2137	2256	2375	2493	2612	2731	2850	2969	3088	3206	3325	3444	3563	3800	4038	4275	4513	4750
26	1235	1359	1482	1606	1729	1853	1976	2100	2223	2347	2470	2593	2717	2841	2964	3088	3211	3335	3458	3582	3705	3952	4199	4446	4693	4940
27	1283	1411	1539	1667	1796	1924	2052	2180	2309	2437	2565	2693	2822	2950	3078	3206	3335	3463	3591	3719	3848	4104	4361	4617	4874	5130
28	1330	1463	1596	1729	1862	1995	2128	2261	2394	2527	2660	2793	2926	3059	3192	3325	3458	3591	3724	3857	3990	4256	4522	4788	5054	5320
29	1378	1515	1653	1791	1929	2066	2204	2342	2480	2617	2755	2893	3031	3168	3306	3444	3582	3719	3857	3995	4133	4408	4684	4959	5235	5510
30	1425	1568	1710	1853	1995	2138	2280	2423	2565	2707	2850	2993	3135	3278	3420	3563	3705	3848	3990	4133	4275	4560	4845	5130	5415	5700

CUBICAL CONTENTS, ROOMS WITH 10FT. CEILINGS

	5	5½	6	6½	7	7½	8	8½	9	9½	10	10½	11	11½	12	12½	13	13½	14	14½	15	16	17	18	19	20
5	250																									
5½	275	303																								
6	300	330	360																							
6½	325	358	390	423																						
7	350	385	420	455	490																					
7½	375	413	450	488	525	563																				
8	400	440	480	520	560	600	640																			
8½	425	468	510	553	595	638	680	723																		
9	450	495	540	585	630	675	720	765	810																	
9½	475	523	570	618	665	713	760	808	855	903																
10	500	550	600	650	700	750	800	850	900	950	1000															
10½	525	578	630	683	735	788	840	893	945	998	1050	1103														
11	550	605	660	715	770	825	880	935	990	1045	1100	1155	1210													
11½	575	633	690	748	805	863	920	978	1035	1093	1150	1208	1265	1323												
12	600	660	720	780	840	900	960	1020	1080	1140	1200	1260	1320	1380	1440											
12½	625	688	750	813	875	938	1000	1063	1125	1188	1250	1313	1375	1438	1500	1563										
13	650	715	780	845	910	975	1040	1105	1170	1235	1300	1365	1430	1495	1560	1625	1690									
13½	675	743	810	878	945	1013	1080	1148	1215	1283	1350	1418	1485	1553	1620	1688	1755	1823								
14	700	770	840	910	980	1050	1120	1190	1260	1330	1400	1470	1540	1610	1680	1750	1820	1890	1960							
14½	725	798	870	943	1015	1088	1160	1233	1305	1378	1450	1523	1595	1668	1740	1813	1885	1958	2030	2103						
15	750	825	900	975	1050	1125	1200	1275	1350	1425	1500	1575	1650	1725	1800	1875	1950	2025	2100	2175	2250					
16	800	880	960	1040	1120	1200	1280	1360	1440	1520	1600	1680	1760	1840	1920	2000	2080	2160	2240	2320	2400	2560				
17	850	935	1020	1105	1190	1275	1360	1445	1530	1615	1700	1785	1870	1955	2040	2125	2210	2295	2380	2465	2550	2720	2890			
18	900	990	1080	1170	1260	1350	1440	1530	1620	1710	1800	1890	1980	2070	2160	2250	2340	2430	2520	2610	2700	2880	3060	3240		
19	950	1045	1140	1235	1330	1425	1520	1615	1710	1805	1900	1995	2090	2185	2280	2375	2470	2565	2660	2755	2850	3040	3230	3420	3610	
20	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000	3200	3400	3600	3800	4000
21	1050	1155	1260	1365	1470	1575	1680	1785	1890	1995	2100	2205	2310	2415	2520	2625	2730	2835	2940	3045	3150	3360	3570	3780	3990	4200
22	1100	1210	1320	1430	1540	1650	1760	1870	1980	2090	2200	2310	2420	2530	2640	2750	2860	2970	3080	3190	3300	3520	3740	3960	4180	4400
23	1150	1265	1380	1495	1610	1725	1840	1955	2070	2185	2300	2415	2530	2645	2760	2875	2990	3105	3220	3335	3450	3680	3910	4140	4370	4600
24	1200	1320	1440	1560	1680	1800	1920	2040	2160	2280	2400	2520	2640	2760	2880	3000	3120	3240	3360	3480	3600	3840	4080	4320	4560	4800
25	1250	1375	1500	1625	1750	1875	2000	2125	2250	2375	2500	2625	2750	2875	3000	3125	3250	3375	3500	3625	3750	4000	4250	4500	4750	5000
26	1300	1430	1560	1690	1820	1950	2080	2210	2340	2470	2600	2730	2860	2990	3120	3250	3380	3510	3640	3770	3900	4160	4420	4680	4940	5200
27	1350	1485	1620	1755	1890	2025	2160	2295	2430	2565	2700	2835	2970	3105	3240	3375	3510	3645	3780	3915	4050	4320	4590	4860	5130	5400
28	1400	1540	1680	1820	1960	2100	2240	2380	2520	2660	2800	2940	3080	3220	3360	3500	3640	3780	3920	4060	4200	4480	4760	5040	5320	5600
29	1450	1595	1740	1885	2030	2175	2320	2465	2610	2755	2900	3045	3190	3335	3480	3625	3770	3915	4060	4205	4350	4640	4930	5220	5510	5800
30	1500	1650	1800	1950	2100	2250	2400	2550	2700	2850	3000	3150	3300	3450	3600	3750	3900	4050	4200	4350	4500	4800	5100	5400	5700	6000

At right—Exterior of the restaurant. Below—The two rectangular grilles (exhaust) of the preliminary system. When refrigeration is added these will be supply and will be changed to the diffuser type.



Ventilation Now—Complete Conditioning To Be Added Later

By R. C. Nason

THE very common practice of trying to sell "all or nothing" or, in other words, gambling on selling the air conditioning prospect a complete, 100 percent, air conditioning system, is criticized by E. J. Chevalier, Specialist, County Refrigeration Service, Mt. Vernon, N. Y.

A much better sales method; a more modern sales method, believes Mr. Chevalier, is to submit the proposal in such form that the prospect can buy necessary first parts of the ultimate system, adding to later as required. To follow such a plan it is necessary to engineer the system so that progressive additions can be added and the system be serviceable and partially satisfactory at any point along the development.

In proof of this idea, the Mt. Vernon sales-engineer cites a recent sale, that concerning a "swanky" new restaurant in White Plains, N. Y., known as Tom Comfort's, this being the owner's name. As this establishment caters to select patronage, complete artificial cooling is the ultimate plan, yet the high initial outfitting cost and six-months leaway on warm weather forced the owner to choose between going without air conditioning or ordering it piecemeal and having the system so designed that subsequent refrigerated comfort cooling can be added with a minimum of waste and extra cost.

Briefly, the prospect had placed before him by County Refrigeration Service three propositions. First, straight ventilation; second, complete year 'round air conditioning and, third, the latter but so divided that the complete plant could be purchased as desired within a six months period. Straight ventilation would be, of course, the cheapest to buy. It would, on the other hand, be the most wasteful if and when refrigerated cooling were to be added, this for the reasons that duct sizes, fan and motor likely would be too small, air velocities would be too high for refrigerated cooling, the arrangement of ducts would be poor for best results.

These factors having been pointed out, the owner decided to place a blanket order for the entire plant of which only fan and ducts thus far have been installed. The dealer arranged things, however, so that only three major changes will have to be made when the owner gives the go-ahead on the addition of the refrigeration and conversion of the system to summer cooling.

The sketches show the plan "as is" and as it eventually will be. The rectangular ceiling grilles

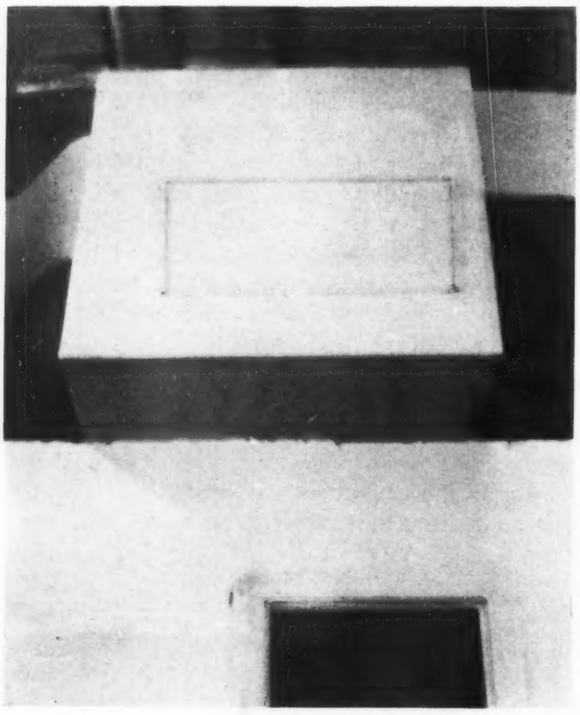
are, as the plant now operates, exhaust grilles. But they are different from commonly seen grilles in that the sheet metal contractor, Frank Simms, placed in each duct opening a round collar. The rim of the collar protrudes into the duct slightly so that impinging metal surfaces can act as scoops. In a few months, when cooling is introduced, concentric ring air diffusers will replace the grilles and the openings will become supplies instead of the present exhausts.

The present "exhaust" duct, is a single trunk running down the center of the room, and is furred in. The line runs to the side of a 5 ft. by 5 ft. by 8-ft. sheet steel apparatus housing set on top of two restaurant toilets and an employee toilet. Most of the equipment load is carried by ceiling trusses and bolted vertical channels.

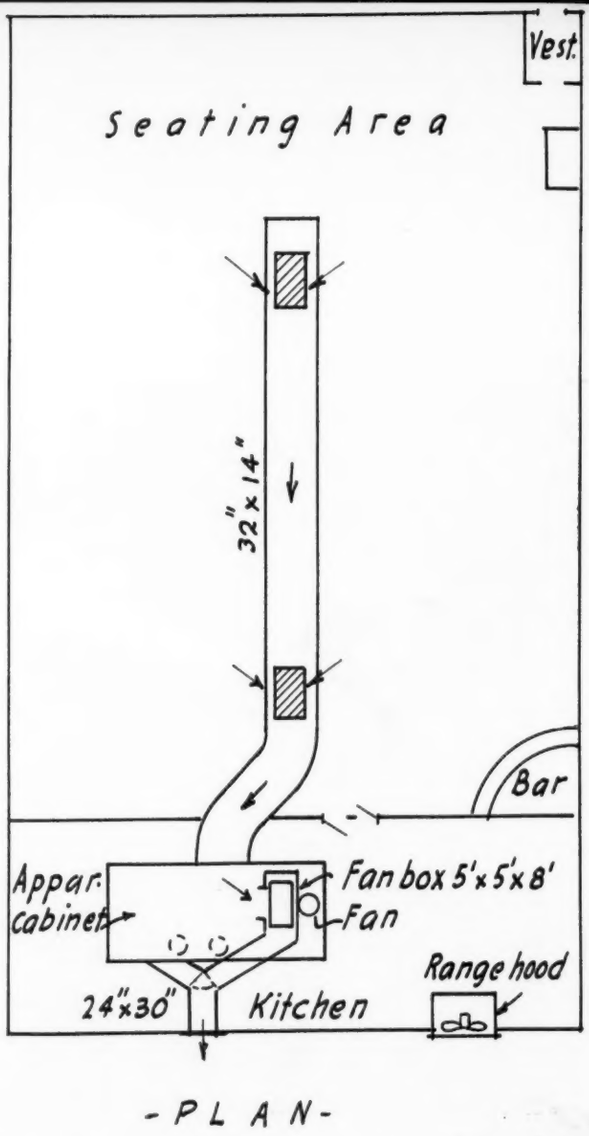
Air Volume Data

The design of the ventilating system contemplates cooling by air circulation. Some 6,000 cfm are circulated through a space approximately 20,000 cubic feet for an air change of theoretically one change each three minutes. Whenever the change is made to cooling by refrigeration this air volume will be reduced to about 3,000 cfm. The ultimate refrigeration system contemplates an entering air temperature of 68 to 70 degrees at a 40-degree Freon suction coil temperature.

In the unusually large steel housing provision has been made by the contractor for the addition



Equipment housing which now contains only the exhaust blower and motor but will house the heating and cooling coils when final conditioning is included.

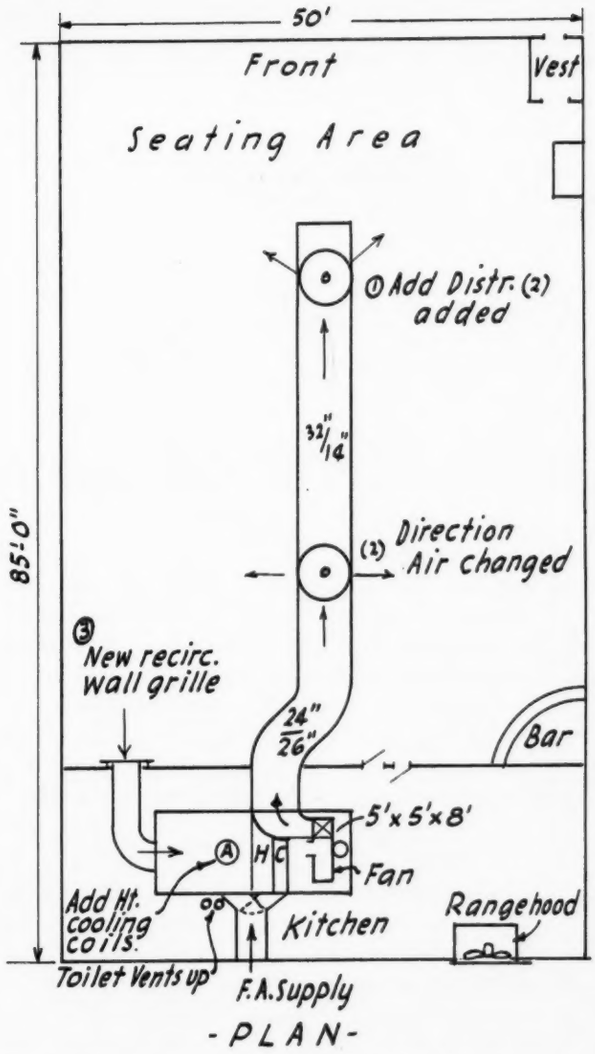


-PLAN-

Layout at present while the system is used for exhaust ventilation. Air from the restaurant is blown outdoors; air to replace air exhausted is admitted through doors, windows, etc.

of refrigeration. See sketch. The extra cabinet capacity will accomodate the expansion coils of the refrigeration plant that is to be installed in the basement. About 125 cu. ft. of cabinet space thus is alloted for the cooling and tempering coils. Their other changes must be made to reverse the direction of air flow from the fan to make it a supply system instead of the present exhaust plant. Another change will consist of dampering to enable taking in outdoor air for supply and thus changing the discharge duct seen in the illustration to a fresh-air intake. This will permit partial, entire or no recirculation of restaurant air.

In the contemplated changes recirculated, or interior, air will not be taken from the kitchen, but from the main restaurant. This involves the installation in an adjacent rear restaurant wall of a flat grille and a new duct to run from this point to the fan inlet within the apparatus cabinet. This will make it possible to recirculate about 25 per cent inside air with 75 per cent outside air. Air velocity at the diffusers will have



The eventual system will be a supply, introducing cooled air (by refrigeration) through the same duct system now used for exhaust. Equipment to be added is indicated on this plan.

to be adjusted after the type and size of diffuser are selected. Probably velocity will be between 60 and 100 fpm—whatever is necessary to get full wall-to-wall movement.

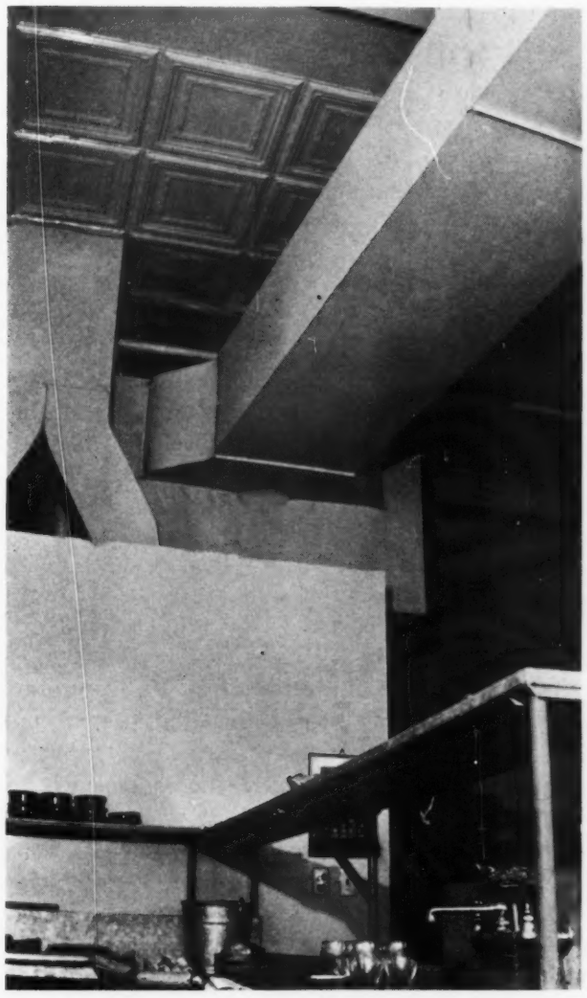
The County Refrigeration Service proposal for a complete system was $2,200; the price without compressor or coils, $1,300. The work thus far installed cost the owner about $600 including kitchen hood exhaust. This is roughly, one-fourth of the total cost. The owner has 6 months to order the fulfillment of the gross contract at quoted figures. When this occurs some $1,600 will be paid for refrigeration equipment heating coils, two air distributors, installation, one new recirculation duct, automatic controls and other minor features.

The merchandising lesson to be noted here, believes Mr. Chevalier, is that had he insisted on the owner buying the complete proposal at this time he probably woud have lost the order because the owner was not inclined to make the gross investment at this time. Or, had the owner ordered only a straight ventilation system he would have had to pay a larger sum in the event that artificial cooling were added.

The salesman, by allowing the owner to place a six-months blanket order whose fulfillment was optional and to be ordered at an indefinite date, was able to design and install work suitable for subsequent cooling addition with minimum cost to both contractor and owner. The owner has the advantage of exhaust ventilation during the winter at the one-quarter investment; he may pay for complete layout from accrued business profits; he expects to pay for the complete plant without bank financing.

In the opinion of the foregoing named salesman all air conditioning plants installed in mercantile establishments of the class here discussed, plus stores and many other classes of commercial occupancy, should be sold on the basis of future addition of refrigerated cooling. Ducts should be oversized for straight ventilation and correct as to air velocity—usually below 600 ft., min.—for

(*Continued on page* 137)



The equipment housing is mounted above toilets (the "Y" duct is toilet exhaust) in a cabinet large enough to take future heat exchanger coils. The duct in the foreground is the present exhaust duct from fan to outdoors.

Pattern Development for

Air Conditioning Fittings*

By William Neubecker
Head Instructor
Sheet Metal Department, New York Trade School

Three-Piece Elbow—Rectangular to Square

IN the accompanying illustration two problems are shown solved by parallel lines and triangulation, covering a three-piece transition elbow from rectangular to square and a three-piece offset rectangular to rectangular in reversed position. The three-piece transition elbow will be taken up first.

Three-Piece Elbow, Rectangular to Square

Referring to the side and front elevation in Fig. 50 let P represent the desired dimensions of the rectangular section and $P°$ the computed dimension of the square section to equal the area of P. In other words if P is 4×12 inches, $P°$ would be 7×7 inches, or $4 \times 12 = 48$ and $\sqrt{48} = 6.93$ or 7 inches.

The first step in drawing the side elevation is to obtain the radius for the center line of the elbow as follows: Take one-half of the wide side of P which is 6 to which add the desired throat radius or 6. Then 12 inches will be the radius with which to strike the quadrant *B-C* inside of the right angle *5-A-8*, using *A* as the center. As the elbow is to have three pieces, divide the quadrant *B-C* in four parts as shown by *C-a-b-c-B*.

Now draw radial line from the center *A*, through points *a* and *c* indefinitely. These lines will be the miter lines connecting the various pieces of the elbow. On either side of *B* lay off one-half of the wide side or 6 inches as shown by *1* and *8*. On either side of *C* lay off one-half of the square side or 3½ inches as shown by *4* and *5*. Complete the rectangular section *P*, 4×12 inches and the square section $P°$, 7×7 inches as shown.

At right angles to *A-8* from points *1* and *8* draw perpendicular lines to intersect the miter line at *2* and *7* respectively. At right angles to *4* and *5* from points *4* and *5*, draw horizontal lines to intersect the miter line at *3* and *6* respectively. Draw lines from *2* to *3* and *6* to *7* to complete the side elevation. The front elevation is shown, but is not necessary in the development of the pattern shapes and can be omitted in practical work.

The patterns can now be developed. To obtain the pattern for the throat, take the girth of *1-2-3-4* in side elevation and place it on the horizontal line at the center right as shown by *1°-2°-3°-4°*. Through these points at right angles to *1°-4°* draw lines indefinitely. Now take one-half of the narrow side of section *P* or 2 inches and set it off on either side of the center line *1°-4°* on lines drawn through *1°* and *2°* as shown in the throat pattern.

In a similar manner take one-half of the square side of section $P°$ or 3½ inches and set it off on either side of the center line *1°-4°* on lines drawn through points *3°* and *4°* as shown in the throat pattern. Connect these intersections by lines as shown, then will *D-E-F-G* be the net pattern for the throat *1* to *4* in the side elevation. For the heel pattern take the girth of *5-6-7-8* in side elevation and place it on the horizontal line above the throat pattern as shown by *5°-6°-7°* and *8°*.

Through these points at right angles to *5°-8°* draw lines indefinitely. Now take one-half of the narrow side of section *P* or two inches and set it off on either side of the center line *5°-8°* on lines drawn through points *8°* and *7°* as shown in the heel pattern. In a similar manner take one-half of the square side in section $P°$ or 3½ inches and set it off on either side of the center line *5°-8°* on lines drawn through points *5°* and *6°* as shown in the heel pattern. Connect these intersections by lines then will *H-J-K-L* be the net pattern for the heel *5* to *8* in the side elevation.

As there is a difference of 3 inches between the narrow side of section *P* and the side of the

(*Continued on page* 128)

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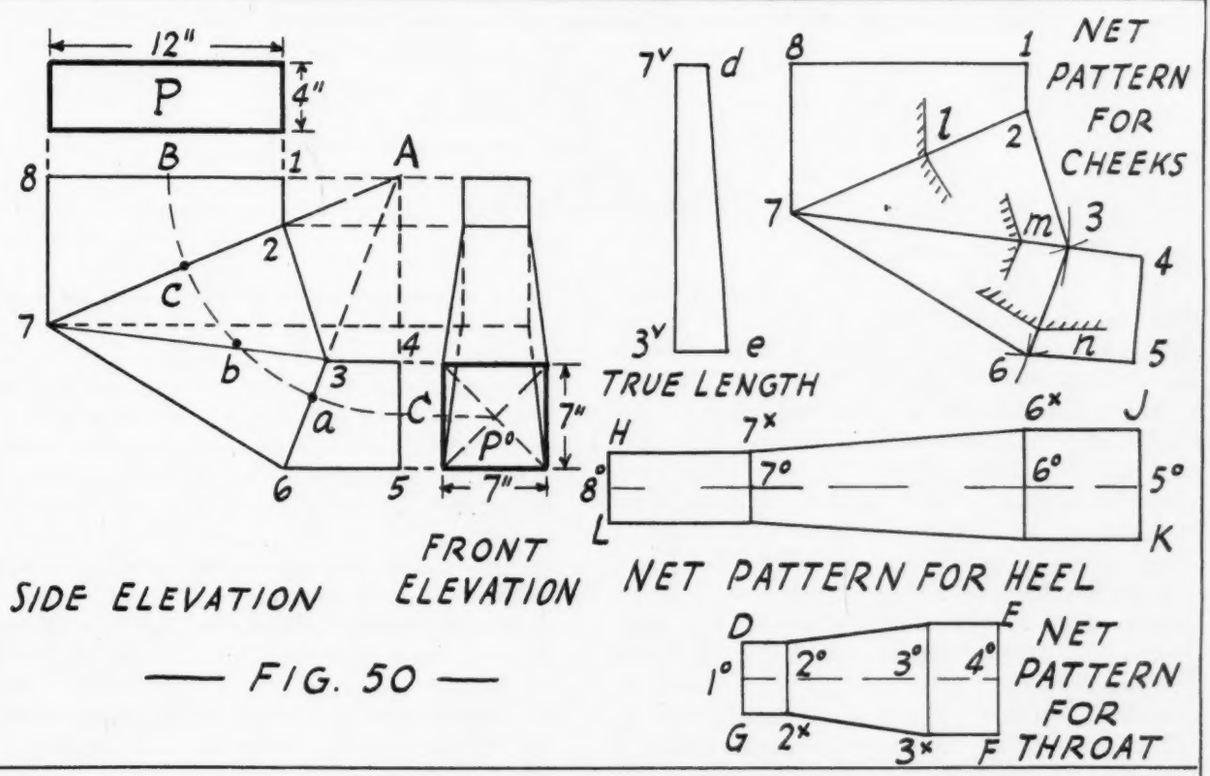
PATTERNS FOR THREE PIECED ELBOW RECTANGULAR TO SQUARE



— FIG. 50 —

PATTERNS FOR THREE PIECED OFF SET RECTANGULAR TO RECTANGULAR

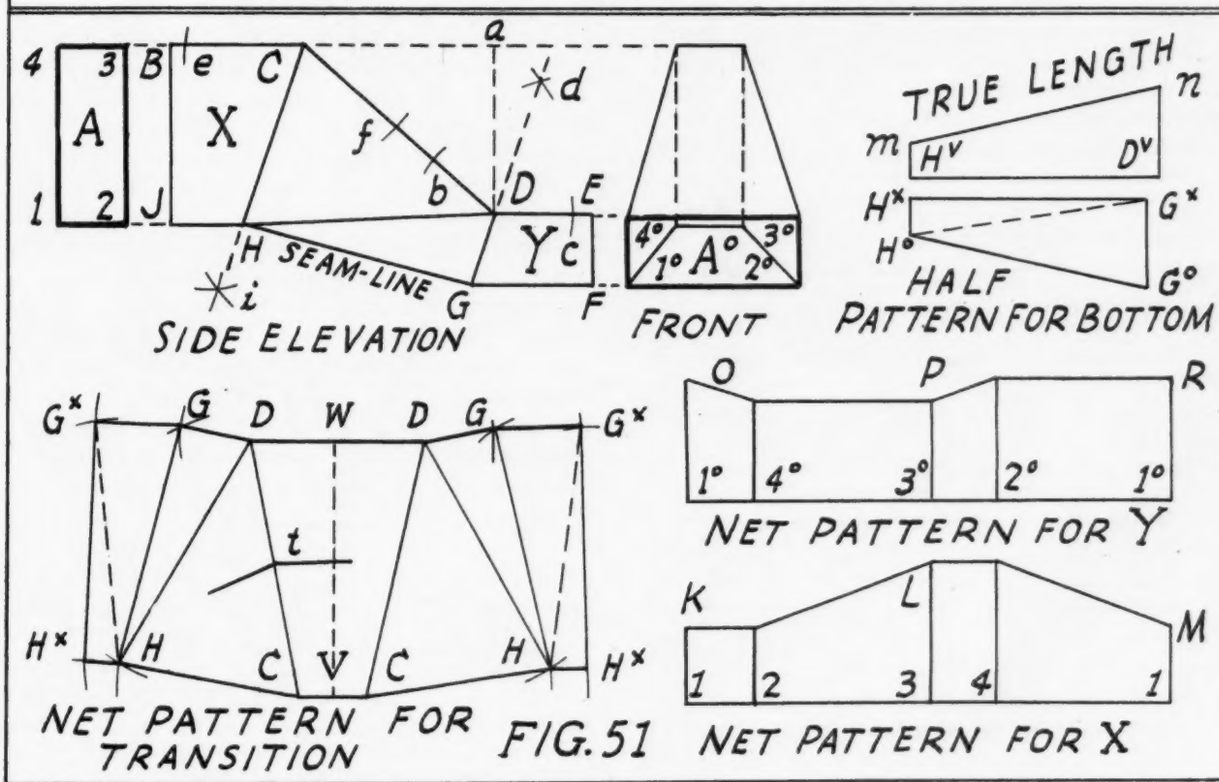


FIG. 51

The Installation and Use of Attic Fans

The Engineering Experiment Station of the Agricultural and Mechanical College of Texas has conducted considerable research on attic and window fans—their costs, results, practicability. This research has covered both laboratory and field installations. From the data gathered the college has published Bulletin 52. This article and others to follow are reprinted from Bulletin 52.

THE low cost of installing attic ventilation for home cooling makes it by far the cheapest method now available for relief from summer heat. This cost, of course, varies with the size of the house and the type of construction, but the average home can be equipped adequately for the cost of a short family vacation, or the expense of adding a porch, or a new electric refrigerator. The average cost of installing an attic fan, not including the fan itself, but including the suction box, ceiling grille, outlet louvers, wiring and other installation costs, will vary from about forty to one hundred and fifty dollars per fan depending upon the type and size of installation required. Ordinarily the cost of an installation in a house under construction is considerably less than the cost of an installation in an existing structure.

Operating Costs

The cost of operating an attic ventilating system is simply the electric current required to run the fan motor. In the average home, which ordinarily requires a fan with a capacity of about 10,000 cubic feet per minute, this cost has been found to be less than seven cents a day, ordinarily about one cent an hour, with larger homes costing slightly more. The Dallas Power and Light Company has made tests of typical attic fan installations in Dallas homes for several seasons by the use of submeters which recorded the power consumed by the fans from May 1st to October 1. These data were derived from 55 installations as shown in Table 2.

Most power rates are based on a sliding scale depending upon the number of kilowatt-hours used each month. Statistics indicate that the average home owner who has an attic ventilating system already has in use a number of electrical appliances such as a radio, refrigerator, vacuum cleaner, washing machine, etc., and therefore the additional power used by an attic fan usually falls in the lowest rate bracket.

Costs in a Test House

The following cost data were secured from an attic fan installation at College Station, Texas, during the summer of 1939. An attic fan rated at 8,000 cubic feet per minute was installed in a residence having a volume or cubic content of 7,800 cubic feet, thus providing slightly more than one air change per minute for the entire house. The power consumed by the fan motor, which drew 200 watts under normal operating conditions, was measured from May 1 to October 1 with a submeter. For this period the total power consumption was 111 kwh distributed as shown in Table III at a total cost of $3.74 for the entire season. This represents a total of 555 hours of operation for the fan at an average cost of about seven-tenths of one cent

TABLE I

U. S. Weather Bureau Data Showing Outdoor Summer Temperature Differences Which May Be Expected During a 24-Hour Period

The highest temperature recorded occurs, generally, between noon and four p. m., the lowest between midnight and 6 a. m.

	July, 1939			August, 1939			September, 1939		
	Mean Aver. daily			Mean Aver. daily			Mean Aver. daily		
City	Max.	Min.	Dec.	Max.	Min.	Dec.	Max.	Min.	Dec.
Amarillo	93	68	25	91	65	26	90	62	28
Atlanta, Ga.	91	69	22	87	69	18	86	68	18
Austin	96	75	21	95	73	22	93	70	23
Birmingham, Ala.	90	71	19	87	70	17	87	68	19
Brownsville	91	77	14	91	76	15	88	73	15
Corpus Christi	90	78	12	90	78	12	88	74	14
Dallas	96	76	20	95	75	20	93	73	20
El Paso	95	71	24	93	69	24	89	66	23
Fort Worth	98	76	28	97	74	23	95	72	23
Houston	92	75	17	93	75	18	91	71	20
Little Rock, Ark.	92	73	19	90	71	19	92	70	22
Lubbock	95	66	29	91	64	27	92	58	34
New Orleans, La.	91	76	15	91	75	16	88	74	14
Okla. City, Okla.	96	73	23	94	71	23	90	65	25
San Antonio	96	75	21	94	73	21	92	70	22
Memphis, Tenn.	89	74	15	88	72	16	89	68	21
Shreveport, La.	97	75	22	91	74	17	94	71	23
Waco	97	72	25	96	71	25	95	67	28
Wichita Falls	102	75	27	99	73	26	96	69	27

TABLE II

Size of Fan (Wheel Diameter) Inches	No. Fans in Test	Average No. Kilowatt-Hours Used per Fan per Season	Total Cost per Season (May 1-Oct. 1) at 4c Per Kilowatt-hour	3c	2c
30	6	149	$ 5.96	$ 4.47	$ 2.98
36	16	274	10.96	8.22	5.48
42	20	331	13.24	9.93	6.62
48	10	400	16.00	12.00	8.00
54	3	900	36.00	27.00	18.00

TABLE III

	Total Power Used by Residence		Power Used by Fan	
939	kwh	Cost	kwh	Cost
May	73	$ 4.92	8	$0.32
June	109	6.18	28	.94
July	120	6.40	25	.60
August	106	6.12	30	1.08
September	98	5.92	20	.80
Totals	506	$29.54	111	$3.74

per hour for an average of 3.5 hours per day for each of the 153 days from May 1 to October 1. This cost is based upon the assumption that the fan power load is in addition to regular monthly power consumption and therefore falls in the lower power brackets. The residential power rate for College Station at the time these observations were made was twelve cents per kilowatt-hour for the first 25 kwh., four cents per kwh. for the next 75 kwh. and two cents per kwh. for all over one hundred.

Selecting the Proper Size Fan

One of the most common mistakes made in installing an attic ventilating system is the selectio of a fan too small for the house to be cooled. Satisfactory cooling requires many times the volume of moving air needed for simple ventilation. Experience gained in the past few years indicates that adequate fan capacity to give a complete air change throughout the entire house, except closets and pantries, of at least once a minute will ordinarily insure satisfactory results in Texas and the Gulf coast region. For instance, if the total volume of the individual rooms of a house is 10,000 cu. ft., a fan with a capacity of 10,000 CFM would be required to produce one air change per minute.

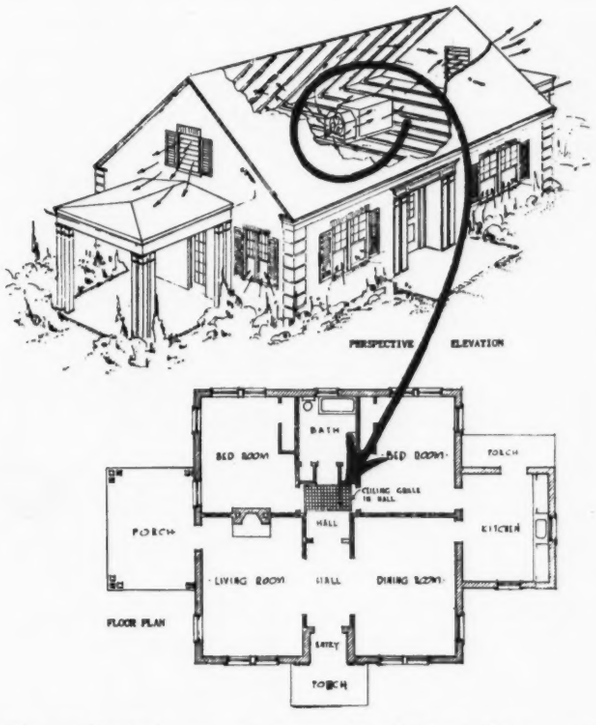


Fig. 2—Typical one-story house installation with central grille and exhaust through gable louvres. The attic is cooled along with the house in this type of installation.

For daytime and early evening operation, and during periods of exceptionally hot weather, it is often desirable to secure more air movement than produced by one change per minute. This may be accomplished by closing off those parts of the house not being used at the time and directing all air moved by the fan through the occupied portion of the house.

In some cases it is necessary to always ventilate practically the entire house at one time. This is particularly true of small houses, apartments, and tourist courts. In these cases, fans with a capacity greater than one air change per minute—from about 1½ to 2 air changes per minute—are often desirable. Larger fans are sometimes required because of a poor intake grille location, high ceilings, rambling house construction, or casement windows. However, where it is possible and satisfactory to ventilate about one-half of the house at a time, one air change per minute will be found adequate for maximum requirements in the hottest weather.

Alternate Floors in Two-Story Houses

In the case of a two-story house it is customary to select a unit which will change the air in the entire house once every minute and a half. The total volume of air handled by the unit can be used for cooling either the first or second floor as desired by opening the windows in the rooms which are occupied and closing all others. This reduced sizing of a fan in this type of installation is possible because ordinarily in a two-story house, when the upstairs portion is being used extensively, the downstairs portion is usually not occupied, and vice versa. However, the habits and customs of the occupants of the house must be carefully considered in order to avoid either undersizing the fan or installing an unnecessarily large one. It is found that it is probable that it will be desired to ventilate most of the house at one time, the fan should be selected on the basis of one air change per minute for the entire house.

Multi-Fan Advantages

Often it is advantageous, and in fact many times it is necessary, because of structural difficulties, to use two small fans instead of one large unit. This makes a more flexible installation without any sacrifice of efficiency. Such installations are particularly adaptable to low attics where there is insufficient height for a single fan of adequate capacity. When two or more fans are used in parallel in a single instal-

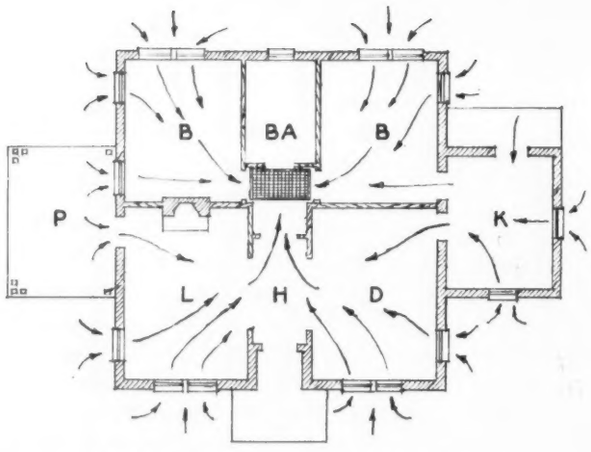


Fig. 41—With all windows open, air circulation is more or less uniform through all rooms. Of course, more air will enter windows close to fan than through remote windows. This can be controlled by the distance windows are opened.

lation, cross-suction from one fan to the other may be prevented by the use of automatic doors on the exhaust side of the suction box or automatic ceiling shutters. Two or more fans in the same suction box should be separated from each other by a fiber board partition or baffle.

In computing the size of the fan the cubic contents or volume of the house must be determined. This is done by multiplying the width by the length by the ceiling height of each individual room, excluding closets and pantries, and totaling their volumes to obtain that of the entire house. Thus, if the combined volume of rooms in a five-room house totaled 12,486 cu. ft., to secure one air change per minute, a fan rated at 12,500 CFM should be selected.

Attic Fan Operation Methods

Attic fan ventilation is most effective after sundown when the outdoor temperature begins to drop, and operation of the unit should begin then and continue until the home is comfortable. However, the longer the unit is operated, the more effective will be the cooling, and many prefer to operate the fan all night, but at reduced speed after retiring. This is possible, of course, only with a two-speed motor.

In the operation of an attic ventilating system there is one simple rule to keep in mind, and that is that the flow of air will follow the path of least resistance. In other words, the greatest amount of air will come through openings nearest the fan. Therefore, in those rooms to be cooled the most distant windows from the fan should be opened. Other windows should be closed or left only partly opened. In this manner the incoming air will wipe across the greatest part of the interior before passing out through the fan and the attic. Fig. 41 illustrates proper air flow through the house when it is desired to cool all rooms at one time.

A properly sized attic ventilating system will have a fan large enough to generate gentle breezes throughout the entire house at one time. However, these breezes may be increased or directed through certain rooms as desired by simply closing the doors or windows in the rooms not in use. This is particularly desirable in extremely hot weather. For instance, if in the early part of the evening only the two bed rooms of the house in Fig. 42 are being used, the air movement in those portions of the house may be increased considerably by either closing the windows in, or the hall doors to, the other rooms. Unless it is extremely hot and it is desired to confine the maximum air movement to the sleeping quarters, upon retiring the entire house should be opened up and the cool night air pulled through it, thus cooling the entire house.

Keep House Closed Till Noon

In the morning the windows and doors on the sunny side of the house should be closed, and the shades or blinds lowered. This prevents the entrance of a great portion of the sun's radiant heat into the house. Only those windows necessary to supply fresh air should be left open By operating the fan at intervals during the day, accumulation of heat in the attic is prevented. Thus, after a previous night's operation, the home can be kept cool and comfortable the largest part of the following day.

On hot days the fan should usually be turned on about 11 o'clock with one or two windows opened on the shady side and located as near the ceiling grille as possible, and preferably windows in a hallway or bath room. In this manner air may be drawn directly from the outside through the ceiling opening and through the attic,

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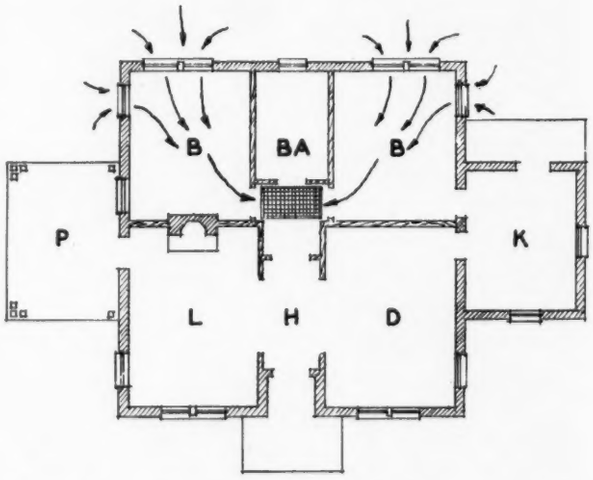


Fig. 42—When increased circulation is desired in one or a few rooms, open windows in these rooms and close all other windows in the house.

[Part 3]

Editorial Note: The two previous articles (in the January and February issues) contain a discussion on "Certified Quality—An Insurance Policy for Better Heating Equipment and Installation," together with reprints of the standards for Certified Quality gas-fired winter air conditioning equipment, the sample heating specifications for use by architects and the guarantee certificates. In addition, these articles contained a description of the uses of other material employed by The Peoples Gas Light and Coke Company of Chicago to promote greater customer satisfaction for gas heating through endorsing and recommending high standards for equipment selection and installation practice. This month's article contains a brief discussion on the results that have been obtained after a year of activity by this Company in the promotion of this program.

Certified Quality—A Year of Progress

A Program for Providing the Architect, Builder, Contractor and Owner with a Measuring Stick for the Selection and Installation of Central-Fired, Gas Heating Equipment.
Sponsored by The Peoples Gas Light and Coke Company of Chicago

By B. A. Johnson
Sales Engineering Manager

THE old saying that the proof of the pudding is in the eating can now apply to The Peoples Gas Light and Coke Company's Certified Quality Program on gas heating equipment. In reporting on the results that have been obtained after one year of promotion of Certified Quality, it may be well to explain some of the reasons why such a program was considered advisable and what tools were considered essential to make it effective.

Naturally, the first and most important question to be answered would be, "Was there a need for establishing a program aimed at protecting customer satisfaction with gas heat?" The answer to this was, "Yes," because in the rapid acceptance of gas as the ideal fuel for heating, the competitive and price factors that entered into the situation created a trend toward cheaper and inferior equipment and installation methods.

To combat this, it was first necessary to provide a definite means for identifying good equipment and good installation practice. This was accomplished by the preparation of the paper, "Information on Certified Quality Requirements for Gas Fired Winter Air Conditioning Equipment Installations" (published in the January issue), which not only gives specific information on equipment features that are considered necessary to give customers added assurance of satisfactory and economical performance, but also provides the data on proper sizing of equipment and covers various important points on design limitations and construction requirements for duct systems, together with other information relating to installation of equipment, venting practices, gas water piping, electrical work, etc.

Standards Alone Not Enough

A set of standards alone would not influence people to want to buy better equipment, or make builders decide to spend a little more money for a better heating installation, or create a desire on the part of architects to specify higher quality equipment, or cause manufacturers of inferior equipment to stop selling in this market or improve their equipment, or even influence contractors to make better installations.

Recognizing this at the outset, The Peoples Gas Light and Coke Company prepared other information and promotional material which was considered essential to do a complete job of creating a consciousness and acceptance of Certified Quality and carried on an active follow-up through its own sales organization. A brief outline of this additional material and promotional activity is presented herewith:

1. The standards, "Information on Certified

Quality Requirements for Gas Fired Winter Air Conditioning Equipment Installations," previously mentioned, were rewritten in the form of detailed specifications and brief specifications (published in the February issue) for use by architects and released to architects and builders.

2. Guarantee certificates were made up in blank for the equipment only and for the equipment and its installation. These were explained in detail in the February issue.

3. Questionnaire forms were prepared for manufacturers who wished to submit their equipment for interpretation by our company.

4. A laboratory questionnaire was set up so that information that was needed from tests or field inspections could be properly correlated and interpreted.

5. A series of questions and answers was distributed to all sales department employes and other departments in the company.

6. Representatives of manufacturers who had been active in this area were invited to a meeting at which time the purpose of the plan was announced and the various details of it explained.

7. A similar meeting was held with active installing contractors. This group, comprised mainly of members of the Air Conditioning Contractors Alliance, subsequently endorsed and adopted as their code the installation requirements of Certified Quality.

8. Publicity material was prepared and released through our "Big Four," a Peoples Gas publication for architects, builders, dealers and realtors.

9. The Peoples Gas Light and Coke Company, through its own Architects and Dealers Section and field sales organization, carried on an active promotion of Certified Quality so as to create a buyer interest in this important phase of our heating business.

The Results

The results that have been accomplished through the promotion of Certified Quality are of particular interest when studied in terms of its effect upon the activities of the manufacturer, the architect, the builder, the contractor and the customer.

Taking the manufacturer first, it is particularly gratifying to report that not only have those manufacturers whose equipment has been interpreted as Certified Quality been active in selling the idea to their dealers and customers, but other manufacturers who did not at the beginning have equipment that measured up to the standards were interested and cooperative in making such changes that made it possible for them to receive a Certified Quality classification.

Architects also accepted the idea with open arms because it gave them a measuring stick for identifying average equipment from good equipment and also a simple means for embodying such equipment and installation specifications in their various projects.

In reporting on the progress of Certified Quality applying to the builders, we have found that the acceptance here is largely based upon the demand on the part of the architect or the ultimate purchaser for such equipment and installation standards. At the present time only builders who have been more or less required to supply such equipment and installation methods are actively accepting and specifying Certified Quality. It is interesting to note that more and more builders are asking for information on Certified Quality because they are requested to furnish it to prospective home builders. This indicates to us that the acceptance is growing in the most vital place because the ultimate purchaser is asking for and willing to pay for quality and workmanship which he can see is intended to give him tangible benefits in heating satisfaction and operating costs.

The acceptance and progress by contractors of our Certified Quality Program are of particular interest because of two factors:

a. There are certain contractors who are always interested in performing high class workmanship and are willing and proud to follow a reasonable set of standards which identifies their type of workmanship as high quality.

b. The fact that The Peoples Gas Light and Coke Company paid to contractors who installed gas heating equipment a bonus prior to the inauguration of this program and subsequently made this bonus applicable only to installations that were made in accordance with Certified Quality standards, created a monetary incentive for many contractors to specify Certified Quality equipment and make Certified Quality installations.

The results for the year 1940, based on an analysis of 1200 actual installations, indicates that about 70 percent of all installation work was made according to Certified Quality standards. There were nine contractors who had a record of making more than 90 percent of their installations Certified Quality. Six of these nine sold Certified Quality equipment exclusively. In this group, 92 percent of the total installations had Certified Quality equipment.

The second group of contractors (seven) did a fairly high percentage of installation work according to Certified Quality standards (80 to 90 per cent). In this group, however, only 52 percent of the total installations had Certified Quality equipment.

Of the remaining contractors who made a reasonable number of installations during the year 1940, the percentage of installation work varied from 33 to 78 percent. In this group, 37 percent

of the total installations had Certified Quality equipment.

The above is illustrated in the following tabulation:

Contractor Group*	Number of Contractors	Percentage of Total Installations	Percentage of C. Q. Installation Work	Percentage of C. Q. Equipment
1	9	17	95	92
2	7	24	86	52
3	21	42	69	37
4	76	17	46	..

*1. *Contractors who did 90 per cent or better Certified Quality work.*

2. *Eighty to 90 per cent installation work was Certified Quality.*

3. *Those who did 6 or more jobs of which the installation work was less than 80 per cent Certified Quality.*

4. *Miscellaneous group of less than 6 jobs per contractor.*

Customer Acceptance

Now we come to the most important part of the report of progress on Certified Quality, namely, "How has the customer reacted to the program and in what way has he obtained any direct or indirect benefits?" Naturally, it is difficult to point at specific results in customer benefits that have been obtained from the promotion of the program for a period of one year. However, we have some information which we believe to be definitely indicative of the soundness of such a program and of the fact that definite and beneficial results are being obtained.

To satisfy this point in our own minds, we made a study of the service problems encountered after installation on 100 typical jobs, all of which were installed in accordance with Certified Quality standards and half of which had Certified Quality equipment specified, and compared these service problems with the problems encountered on another sample of 100 installations, none of which were installed according to Certified Quality standards and half of which had Certified Quality equipment specified.

The results obtained from this analysis indicated very conclusively that following Certified Quality installation practice will definitely reduce customer problems after installation. This is illustrated in Table I.

While we do not maintain that a Certified Quality installation benefits the customer in lower operating costs, we have found that the average operating costs of a group of 29 installations which had neither C. Q. equipment nor C. Q. installations was $120.00 per season as compared with an average operating cost of $114.00 per season on 37 jobs which had both C.Q. equipment and C. Q. installations. These figures were arrived at after proper allowances were made for domestic consumption and degree days.

TABLE 1

Service Problems Encountered After Installation

Equipment Problems	C. Q. Installations	Non-C. Q. Installations
Pilot	12	21
Controls	15	13
Burner	..	6
Blower & Filter	3	2
Noise	3	3
Motor	2	..
	36	45
Installation Problems		
Wiring Electrical	4	5
Heat: Distribution	4	10
Heat: Insufficient	—	—
Heat: Balance	8	15
Miscellaneous Problems		
Explain operation	10	5
Other	9	17
	19	22
Light-up Calls		
O. K.	45	43
Not Ready	10	23
Required Adjustment Before Starting:		
Equipment	6	13
Installation	3	1

Conclusion

One year of effort in promoting customer satisfaction for gas heat through recommendations of standards to be followed by equipment manufacturers and installation contractors has already shown definite progress. Most gratifying is the increasing interest of the builder and user. They are becoming more discriminating about what they purchase in the line of heating equipment. This, in itself, will carry the program to ultimate success.

Because this program is aimed at giving the user of gas heat a better and more economical way to obtain heating service; because our experience so far has indicated that it has accomplished definite results in reducing service problems and increasing customer satisfaction; because manufacturers, contractors, architects and builders are becoming more and more enthusiastic and cooperative toward this program; and because The Peoples Gas Light and Coke Company does not try to set itself up on any dictatorial basis for promoting this program but, on the other hand, offers whatever facilities it has at its disposal for cooperating with all parties concerned, we believe that Certified Quality (C. Q.) will be the accepted standard for gas heating in Chicago.

Air "Avidity"

A New Thought in Residential Humidification (Part 2)

By O. J. Kuenhold

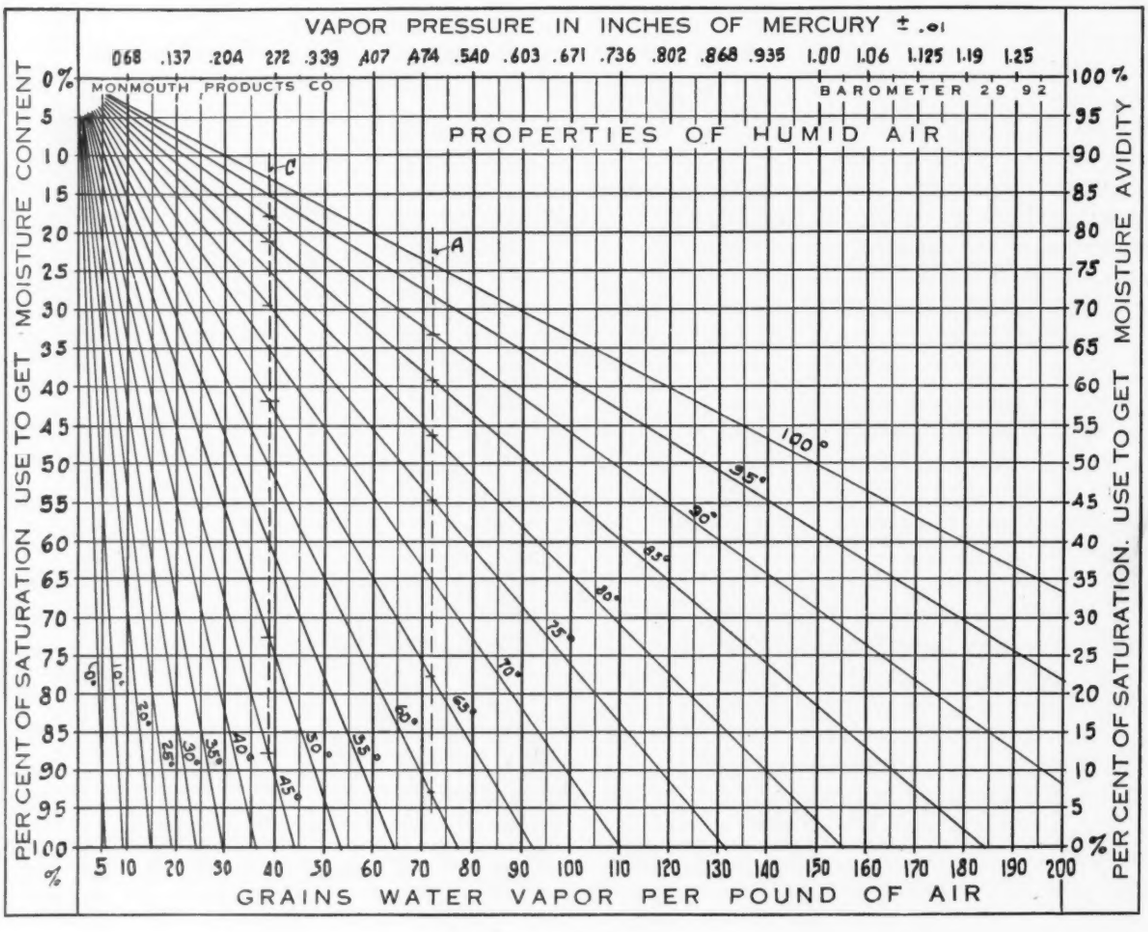
Humidification Engineer, Monmouth Products Company

THE preceding article on humidification (March) explained that the term "relative humidity" could more properly be called the "per cent of saturation" because it is merely the ratio between the moisture contained in air to the moisture air could contain if saturated. It was also explained that the moisture absorbing capacity of air is dependent, not on the per cent of saturation (relative humidity) nor on how many grains of moisture the air holds, but on how much *more* moisture it can hold at its temperature. This moisture deficit we call the moisture "avidity" of the air.

The "moisture avidity" is expressed in grains of moisture per pound of air. It is a direct measurement of the moisture absorbing capacity of the air. To find the moisture avidity of air you must know its percent of saturation (relative humidity) and its temperature; then by reference to a table or chart you can find its moisture avidity.

Chart I shows the relationship between air temperature, per cent of saturation, moisture content, moisture avidity and vapor pressure. With it many examples can be worked out, almost at a glance, and a better understanding of air

Chart I



humidity result. To find the moisture avidity or drying capacity of air; Find its per cent of saturation at the right. Follow the horizontal line to the left until it intersects the diagonal temperature line and immediately below this find its avidity for moisture in grains per pound of air. Example: At 35% saturation and 70 degrees temperature, the moisture avidity is 72 grains of water vapor per pound.

What per cents of saturation will have the same moisture avidity or equal drying effect at various temperatures? The vertical dotted line "A" represents 72 grains per pound avidity. From this you can see that to have equal breathing comfort with air at 70° and 35% relative humidity, you must raise the humidity to 45% if you heat the room to 75°. Similarly, with 80° room temperature you should humidify up to about 54%. At 85° you must raise the humidity to about 61%. On the other hand if you could feel body comfort at 65° you would have to carry only about 23% humidity to have the moisture avidity of the air equal to that of 70° room temperature and 35% relative humidity.

Moisture Content of Air

To find the moisture content of air, find the per cent of saturation of the air at the left. Follow the horizontal line to its intersection with the diagonal temperature line and directly below this find the water vapor content. Example: At 35% saturation and 70°, each pound of air contains 38 grains of water vapor. The vertical dotted line "C" shows the per cents of saturation at which each pound of air contains 38 grains of moisture, for instance 65° and 42% humidity; 75° and 29%; 80° and 25%.

We can now consider what happens to the membranes of the upper breathing passages when air of unduly high moisture avidity is breathed. For thousands of generations humans have lived in Nature's outdoor air in localities where animal and vegetable food existed. In such localities—plains, forests and valleys—there are trees and other plant life. When Nature warms the outdoor air, she also adds moisture to it. Every tree and all vegetation draws moisture from the soil and disseminates it through its leaves. Man has therefore always lived in and breathed Nature's humidified air.

No law of Nature is more thoroughly substantiated than that the organism of plants and animals, such as Man, adapts itself to existing conditions. The breathing mechanism of man, for instance, has, by thousands of generations of living in and breathing Nature's humidified air, adapted itself especially for air having moderate moisture avidity.

In summer, for instance, the air temperature may be in the vicinity of 80° or 85°. It is normally humidified to 55 or 60%. Its moisture avidity is therefore in the vicinity of 70 grains of moisture per pound, or less. Winter air holds nearly all the water vapor it can absorb. Its avidity for absorbing more moisture, while at low temperature, is much less than the usual moisture avidity of summer air.

How Dry Air Affects Membranes

It is only in comparatively recent generations that man has begun to live in heated and enclosed spaces, such as homes. In heated homes the moisture avidity of the air is much higher than that of outdoor air. Our breathing organism is not adapted to breathe such air. To remedy this we must do as Nature does when She warms the outdoor summer air—we must add moisture to restore to the air the lower avidity for moisture for which our breathing organism is adapted.

The membranes of our upper breathing tracts continuously secrete moisture and, under normal healthful conditions, they remain moist. Their function is to humidify the air to about 100% before it enters the bronchial tubes and lungs. The moistened surfaces also serve to catch dust which otherwise would lodge in the lungs. The moisture can be secreted at a certain rate, but when air is breathed having higher moisture avidity than the avidity for which the breathing organism is adapted, the moistness of the breathing tracts is reduced and a certain stress is created, evidenced in some people by a stuffy feeling, the first warning of an unhealthful condition. There is an instinctive longing to get outdoors to breathe Nature's humidified air. Going outdoors gives immediate relief.

Raising Temperature "Dries" Air

Next let us consider why heated indoor air becomes dry and how dry or avid for moisture, it becomes. All indoor air originates from outdoors by leakage and otherwise. The average weight of water vapor contained in outdoor air varies with its temperature. Table 3 shows how many grains of water vapor each pound of water vapor contains opposite the various weather temperatures listed in the left hand column.

The colder the air is, the less water vapor it can hold. The little water vapor it holds is therefore adequate to give it high humidity and low moisture avidity. When the cold outdoor air seeps into a house it still contains exactly as many grains of water vapor per pound, but when the air is warmed to a higher temperature, its capacity for holding more moisture, and hence its thirst, is greatly increased. The difference between the little water vapor that the air contains and the water vapor it can hold at its higher temperature measures its water absorbing capacity, or moisture avidity.

Table 3 gives the moisture avidity of the indoor air at various room temperatures and during various outdoor temperatures. The moisture avidity given is an average, subject to little variation in below freezing weather or in the higher room temperatures. For example, with the rooms warmed to 70° in 30-degree weather, the moisture avidity of the indoor air will be 91 grains per pound. We may assume that avidity at 70 gives breathing comfort and is therefore healthful, consequently 21 grains of moisture should be added per pound of air.

Now consider the case of rooms heated to 80 in 20° weather. The moisture avidity of the air will then be 143 or more than twice the assumed normal of 70. In zero weather and 85° room temperature the avidity (179) will be more than 2½ times the assumed normal of 70. That is, the membranes of the breathing passages will have to secrete moisture 2½ times as fast as normal. The resulting stifling sensation in breathing would be so strong that few persons could stand it, aside from the bodily discomfort. This explains the origin of the expression "stifling hot." In this the word "stifling" refers to the breathing discomfort and the word "hot" to body discomfort.

TABLE 3

MOISTURE AVIDITY OF INDOOR AIR

When No Humidifying Is Done

Outdoor Air			Indoor Temperature					
Temp.	Moisture Content	% Saturation	60°	65°	70°	75°	80°	85°
0°	5	93	72	88	106	125	151	179
10°	8	88	69	85	103	122	148	176
20°	13	85	64	80	98	118	143	171
25°	17	83	60	76	94	114	139	167
30°	20	81	57	73	91	111	136	164
35°	24	78	53	69	87	107	132	160
40°	28	77	49	65	83	103	128	156
50°	39	72	38	54	72	92	117	145
60°	53	63	24	40	58	78	103	131
70°	60	54	....	....	51	71	96	124
F	Grains per lb.	Average	Moisture Avidity—Grains per lb. Air					

Where Table 3 shows avidity above 70, humidification is required. Subtracting 70 from the given avidity tells how many grains of water must be added per pound of air to reduce the avidity to 70. Note that with 65° room temperature, no humidification is required until weather gets below 35. With the usual 70° room temperature, no humidification is ordinarily required until weather gets below 50°; but at 80° room temperature some humidification should be done even in 70° weather and, in 30° weather, three times as much moisture must be added to the air as in 70° weather.

Why Night Air Feels Moist

Many people living in inadequately humidified homes cannot sleep well or at all unless they partly open a bedroom window. The stifling feeling is due to the high moisture avidity of the air. When the partially opened window reduces the room temperature, this reduces the capacity of the air for absorbing moisture. The avidity then drops down within the range of breathing comfort and refreshing sleep follows. Suppose for instance the bedroom is at 70°, the weather at 20°. As Table 3 shows the moisture content of the air will be only 13 grains per cubic foot, corresponding to avidity of 98. If the room temperature is reduced to 60°, the avidity will be only 64, which is within the breathing comfort range.

Opening the window does not materially increase the oxygen content of the air, because normal leakage, especially with an open bedroom door will keep the air pure. A person at rest breathes only 15 cubic feet of air per hour which reduces the oxygen of the air that is breathed by only one-fifth. The oxygen reduction of the air in the room is therefore insignificant. Only a half of a cubic foot of carbon dioxide is added into a room having probably at least 1000 cubic feet, into which at least 350 cubic feet of outdoor air seeps in every hour when windows are closed. The actual fact is that the thing that causes the air in the bedroom to seem so very much fresher when its temperature is reduced even 10 degrees, is that the reduction in air temperature markedly reduces its capacity for absorbing needed moisture from the breathing passages, restoring breathing comfort and eliminating the stuffy feeling that is Nature's indicator of an unhealthful condition.

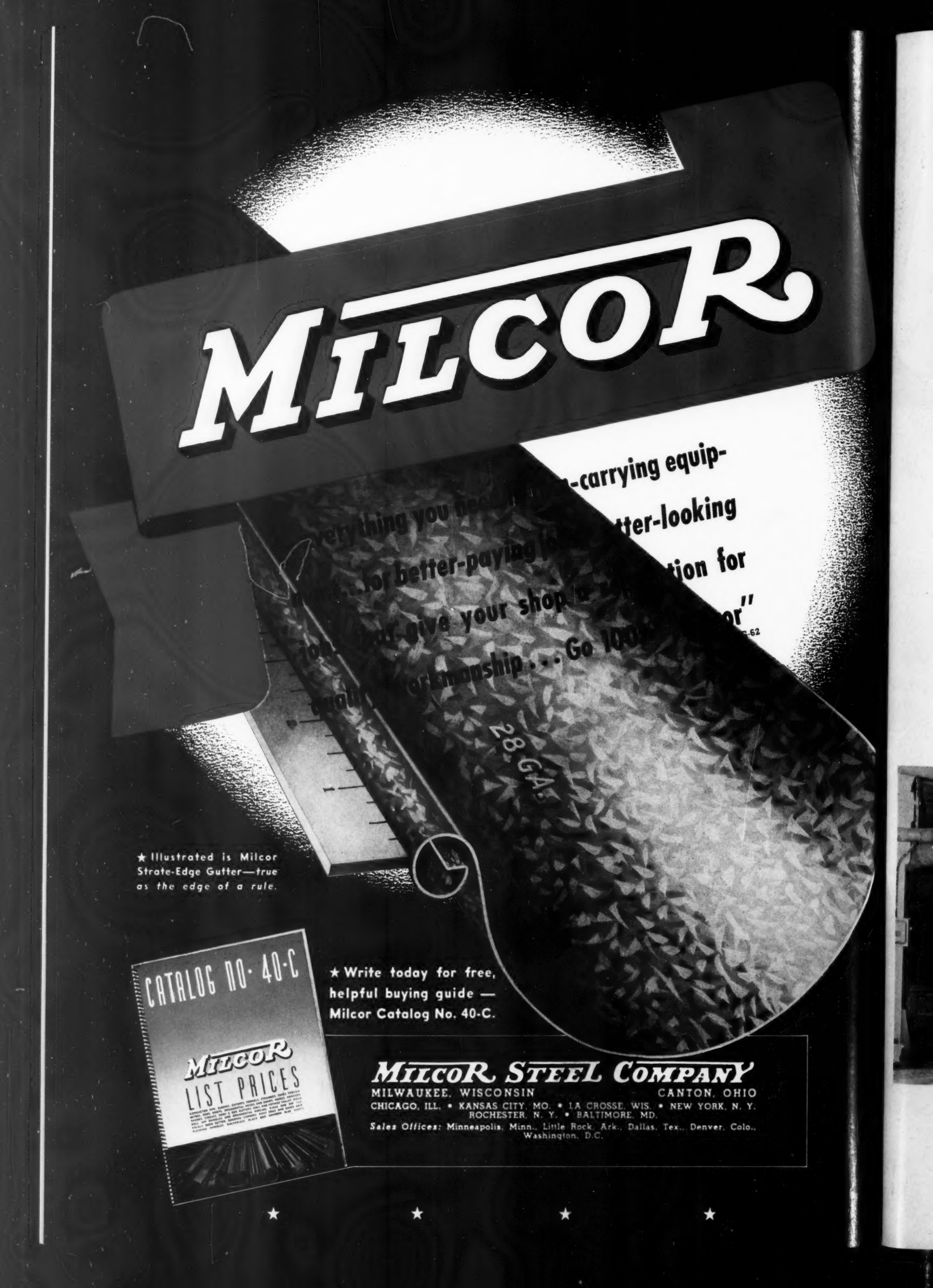
Humid Air Relieves Colds

Other evidences of the influence of moisture avidity upon the breathing passages are: When you go outdoors into the cold air, which has very low moisture avidity, from warm indoor air having high moisture avidity, the upper breathing passages become healthfully moist. So little moisture is absorbed by the air that is breathed that there may even be a surplus of moisture secretions—especially in children. If you have a stuffy head cold, note the relief when you go into cool outdoor air, or, put a kettle on the kitchen stove to raise the humidity in the kitchen and note the increased breathing comfort when the air hu-

(*Continued on page* 136)

SHEET METAL SECTION

DEVOTED TO SHEET METAL CONTRACTING AND FABRICATING



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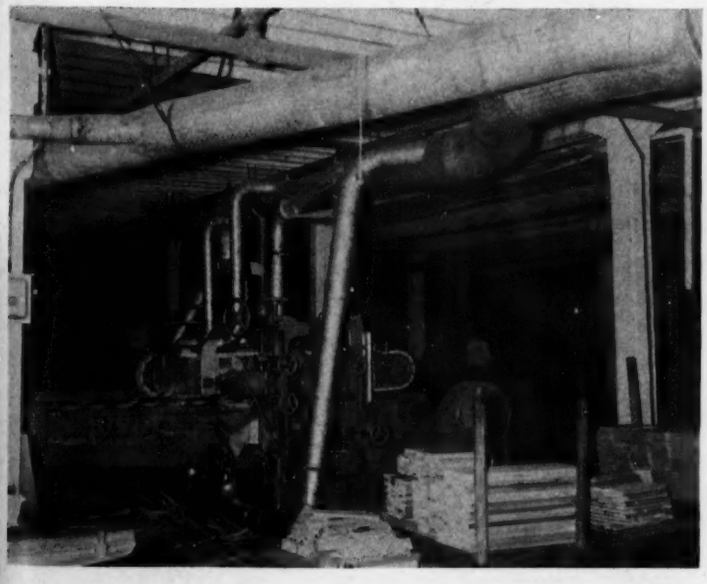
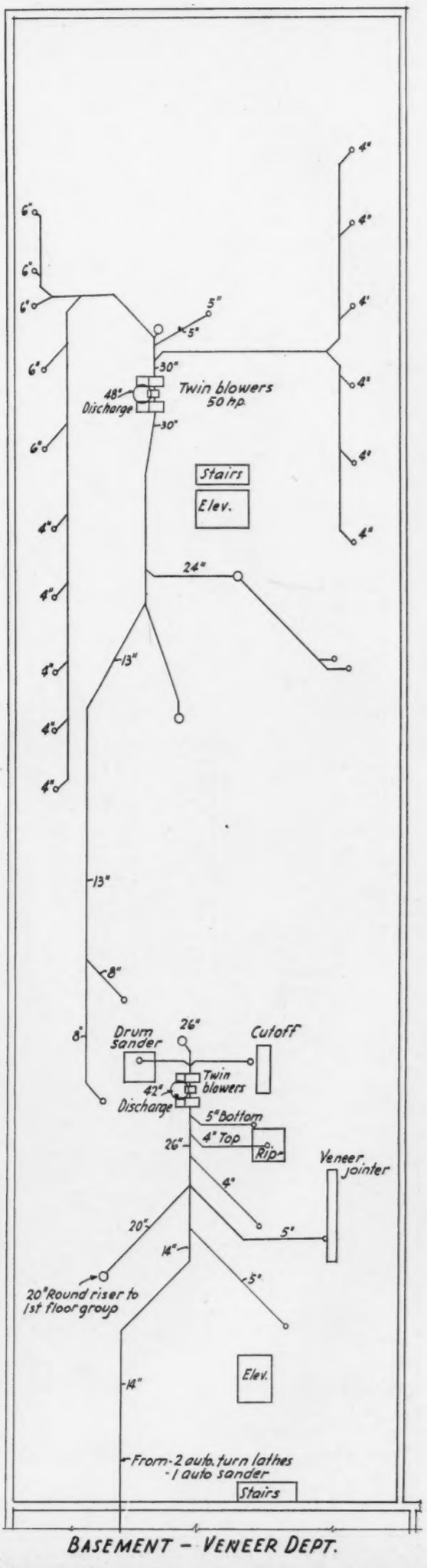
Material Collecting System in a Furniture Factory

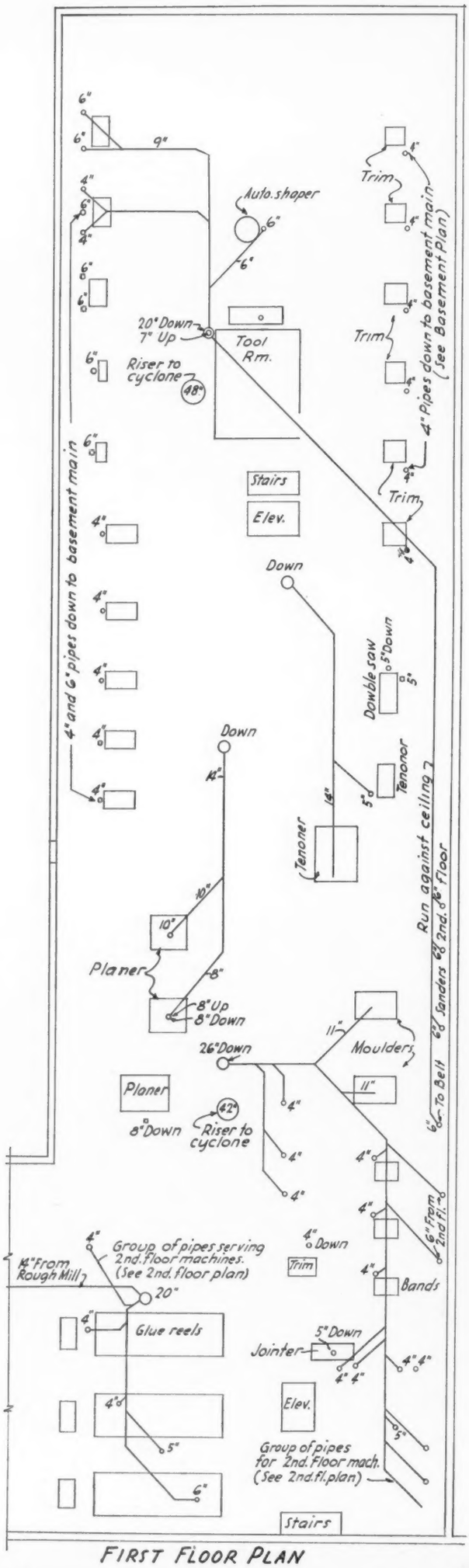
ONE of the largest and most complicated material handling remodeling contracts let in recent years in the Chicago area was completed a short time ago by Rockford Industries, Rockford, Illinois, for the Weiman Company, special furniture manufacturers. Rockford Industries is an engineering and contracting organization fashioned around several individuals, each a specialist in his particular field. Sheet metal, ventilating and blow piping is under the management of Edward Bentz, one of Rockford's best known, long-time operators.

The installation is shown in detail in the plans and photographs. The installation was made in an old Rockford furniture factory, which the Weiman Company purchased and remodeled and re-equipped to manufacture special furniture. Some of the original equipment was taken over with the building; much of the machinery was moved from the former Weiman plant; a considerable number of new machines were purchased—particularly new model machines which



Double end tenoner (new machine) one of the largest machines requires six conveying pipes as shown feeding into a 14-in. branch. Placed at end of line (see first floor plan). At right —Basement plan showing blowers, mains, sub-mains and machines.





FIRST FLOOR PLAN

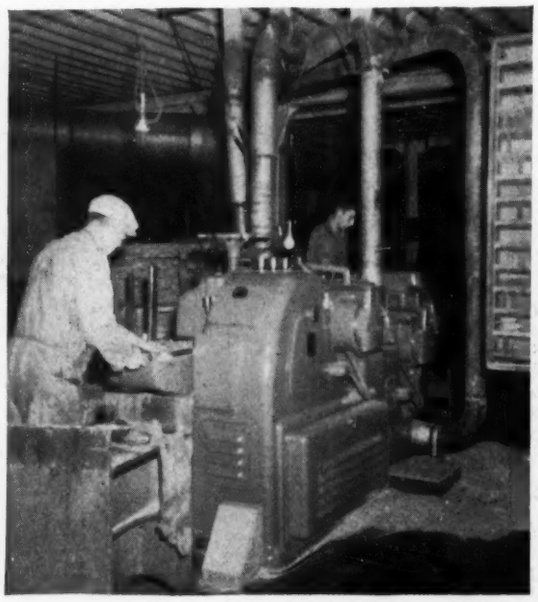
Piping for the double end tenoner must be free to move with the carriage. This shows method of supporting piping on integral posts and supporting rail on which the pipe assembly slides. A slip joint in the 14-in. pipe allows movement.

are of the latest types for special operations.

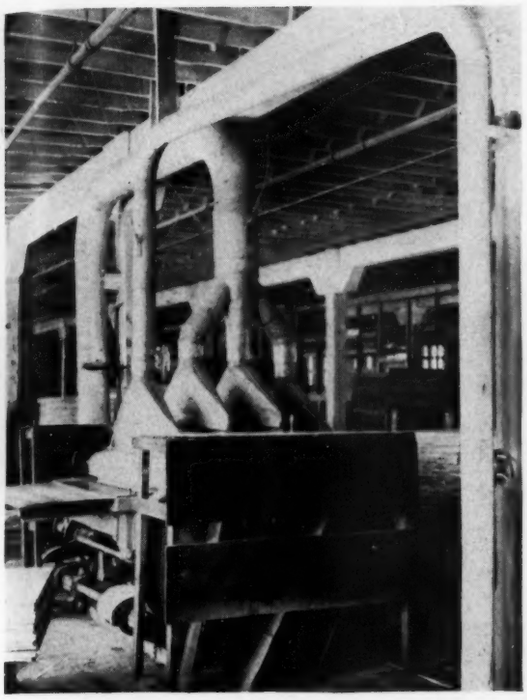
Production Not Interrupted

One of the ticklish features of the contract centered around the Weiman company's requirement that production be delayed as little as possible. In other words production continued as normally in the old plant while machines were moved and set in the new quarters in such manner that while a few machines of one type were being moved other machines of the same type continued in operation. Then production was switched to the new plant and the remaining machines of a given type shut down and moved.

This arrangement complicated the duct system construction but was taken care of by careful



One of a pair of moulders each with four heads requiring four conveying pipes into an 11-in. branch. (See first floor plan.) Two heads require slip pipes. At left—First floor plan. Note sub-mains for both first and second floor machines.

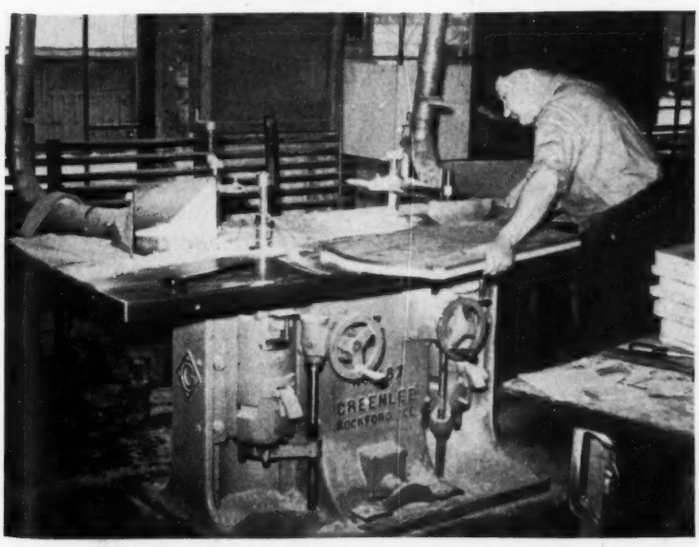


This three-drum sander requires four conveyors. One head has a separate pipe; the other three heads are hooked into a single large branch. Heads must be raised to change the sanding paper so slip joints are provided as shown. Pipe work here is partly new, partly old. Right—Second floor plan showing exhaust mains to separator.

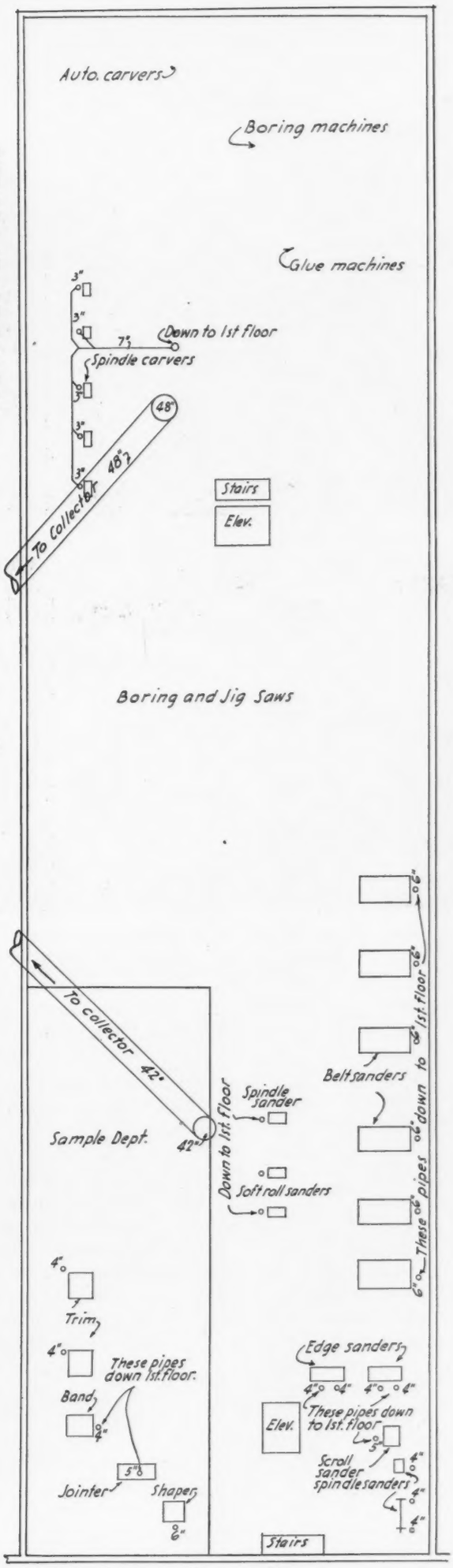
preliminary planning. In laying out the job, Mr. Bentz, with Weiman production men, selected the floor spaces where groups of machines were to be located. Then the branch pipes and mains were spotted to the fans and these pipes fabricated and erected so far as possible. There was some piping in the building and this was used in place or cut apart and used where possible either as complete runs or as pipe pieces.

This was the procedure worked out on paper, beforehand. The plan could not always be followed, however, because changes in machine location were necessary or because someone decided on a better arrangement. Some piping hung had to be taken down and moved to accommodate such changes.

The general arrangement of the system for the building as a whole is shown on three floor plans.

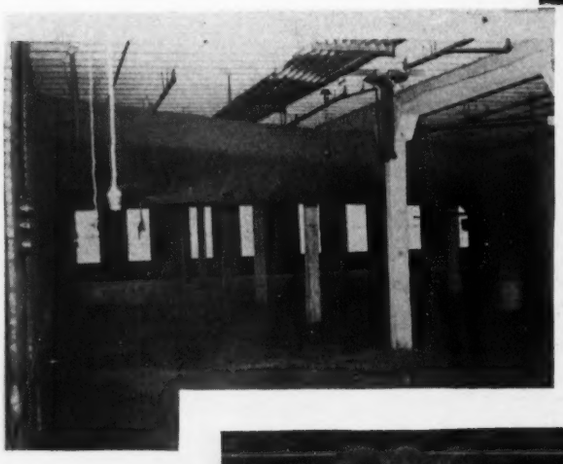


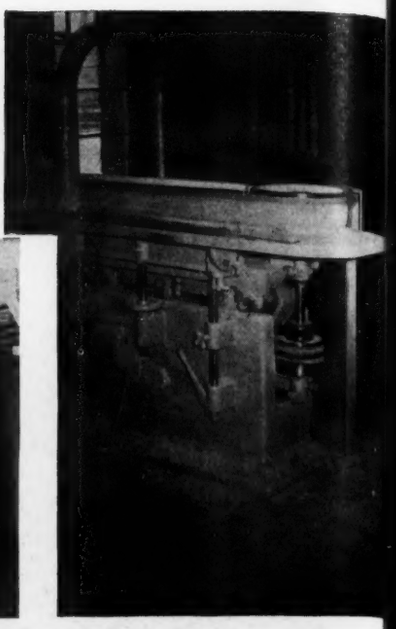
Vertical head shaper with two heads and two "maw" hoods requiring high hood velocity to pull dust into hood. Hoods swing off table to clear working surface.

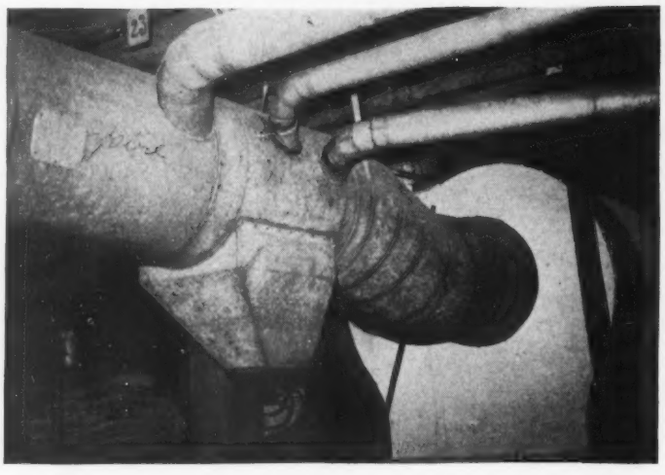


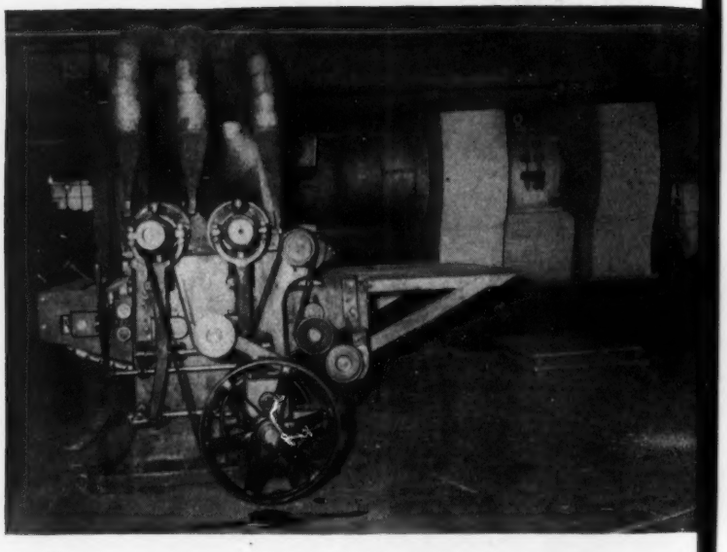
SECOND FLOOR PLAN

Top, left—Old separator used with new system. Waste feeds by gravity into boilers. Top, center—48-in. line from fan to separator through second floor. Top, right—Edge sander with hood (high velocity slot) at end of working surface to catch dust as sanding belt leaves work.









Bottom, left—"Chunk" trap in main just before main reaches blower. Pieces heavy enough to injure fan blades drop into trap and are emptied periodically. Bottom, right—Larger pair of blowers with motor between housings. In foreground a twin-drum sander with three hoods. No slip joint for raising hoods.

Most of the operating machines are on the first floor; a few are or will be on the second floor; a few are or will be in the basement. The fans are in the basement; the cyclone separator is outside the building, above the boiler house so that waste can be burned in the boilers.

The final mains are in the basement and to these mains all sub-mains are dropped from the first and second floor. Also, as the plans show, waste from some machines is conveyed through pipes dropping down from the machines. Other machines must have rising branches. The result is sub-mains through the basement for first floor machines; sub-mains through the first floor for first floor machines and other sub-mains through the first floor for second floor machines.

Eventually, as the plans show, all these sub-mains come together into large drops to the basement. In the basement these mains attach to two twin-wheel blowers, as shown—both these blowers were already in the building. The blowers could not readily be moved because of their heavy concrete foundations and also because moving would have necessitated considerable expense in changing motor wiring. Another reason for not moving the fans was that any shift in the blowers would have meant shifting the large discharge pipes running to the collector. Because the blowers could not be moved it was necessary, in a good many instances, to install longer runs of piping than would have been necessary if the blowers could have been re-located.

When the arrangement of machines was first projected it was intended to divide the air volumes moved and also the resistances set up by long runs of pipe as nearly proportional as possible to the size of the two fans. However, as changes in locations were made; as new machines were purchased; as groups were shifted around, this original division of service could not be maintained so the air volumes handled by the fans

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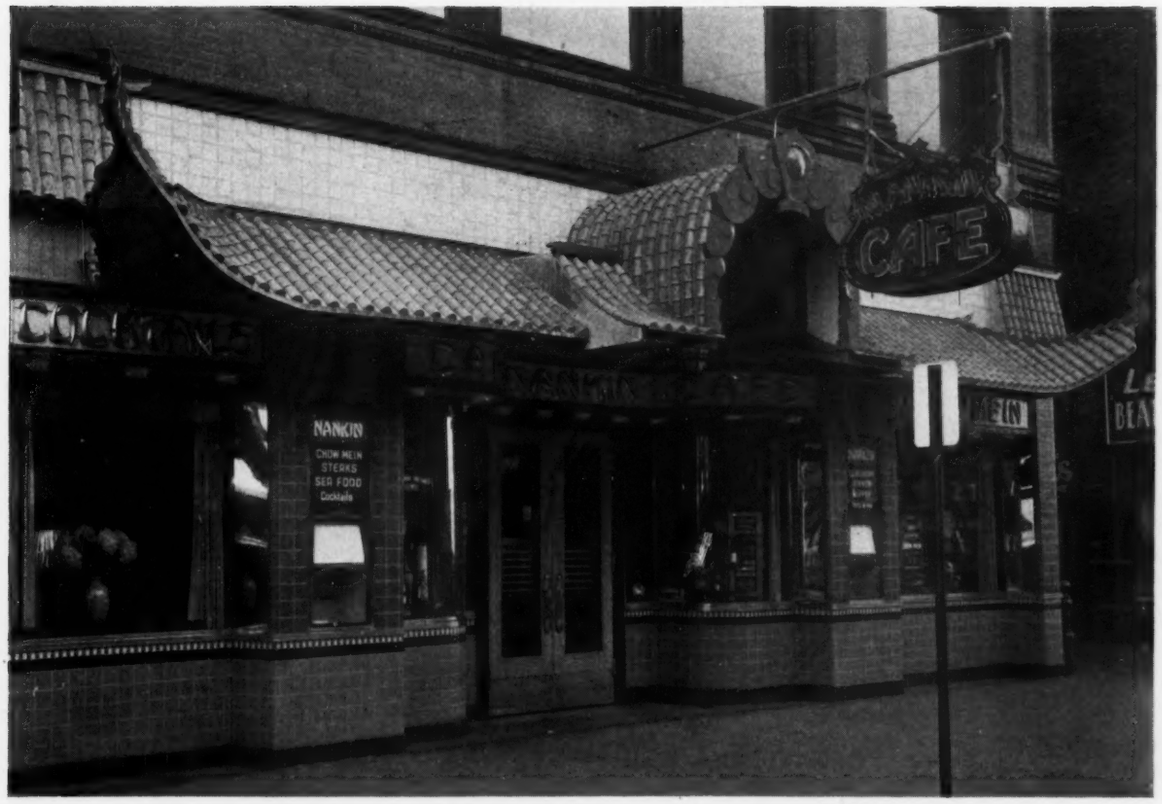

Shop Fabricated Ornamental Marquee

GENERAL Sheet Metal Company, Minneapolis, built the highly ornamented marquee shown in the photograph for a local restaurant using galvanized iron, copper, and shop made ornaments. The outer tile is copper; the dragons and horseshoe are copper; the ceiling is galvanized iron and ply-wood; the framing is structural steel.

The marquee was assembled on an angle iron and strap iron frame as shown in the sketch—this framing was erected by another concern.

The tile were made in small sizes—approximately 5 inches center to center of the tile. Each tile consists of a rolled half which was stamped in a shop-made die and an adjoining pan surface which serves to space the tile when laid. Each tile is about 6 inches long. The tile are wired to the supporting frame.

The photograph shows sea-dragon ornaments at the end of the marquee. The sheet metal contractor was furnished a sketch for these and built the dragon and the backbone as a full box assembly soldering the pieces together along the top where the seam does not show from the sidewalk. The dragons are copper and 2 inches thick.

The horseshoe ornament across the front of the central arch is 6 inches thick at the key section and each section reduces ¾-inch so that the lower end pieces are only 2 inches thick. Each section is a full box section; of copper, soldered along the two edges of the back and was assembled into a complete unit for erection. The ceiling of the marquee is the upper leg of the frame. The bottom chord of each frame is open. The top leg is a structural angle to which plywood sheets were bolted to give a flat ceiling surface. Flat bars were then bolted through the plywood to the angle and then sheets of "Paintgrip" were glued to the plywood to obtain a metal ceiling and the metal was painted. The sheets were turned behind the bars.

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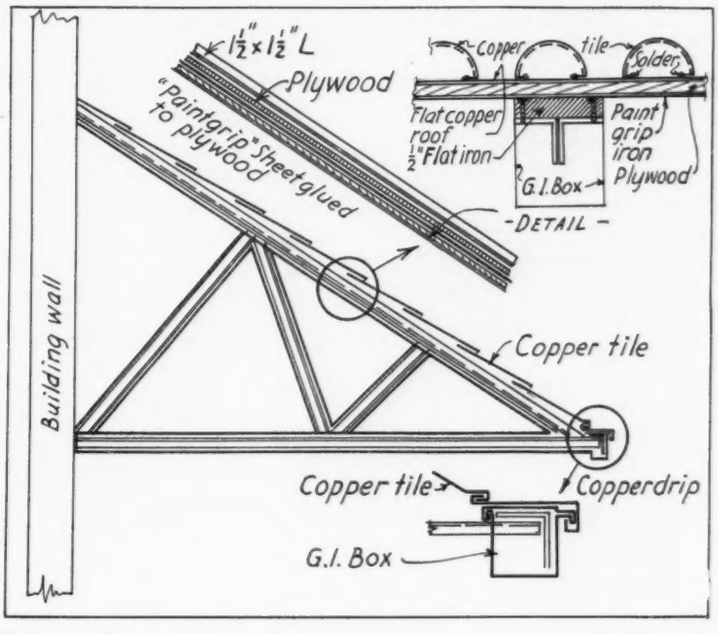

Hot Dip Tinning*

of Milk Cans and Ice Cream Cans [Part 1]

By Wallace G. Imhoff
Wallace G. Imhoff Co.

The tinning of new and old containers is a service many shops are frequently called upon to render. This article and part 2 following explain how manufacturers and tinning specialists clean, tin and handle cans. While the methods described presume a large production, the recommendations apply to work in small volume also.

As might be supposed, no two plants use exactly the same materials, the same equipment, and the same practical methods in hot-dip tinning and retinning milk cans and ice cream cans. The purpose therefore at this time is to furnish information of a technical nature that will be of value, and can be used in most any plant, anywhere.

Material for Cans

There are many different sizes and shapes and designs of milk cans, and in addition some cans are heavy cans and some are light cans. Heavy milk cans have a 16 gauge breast and an 18 gauge body. The steel has three cold rolls, has been pickled, and limed. The light milk can has an 18 gauge breast and a 22 gauge body. The body, like the heavy can, is made of hard cylinder stock. The 32 quart can has a 16 gauge breast and an 18 gauge body. The 5 gallon can has an 18 gauge breast and a 20-22 gauge body. The steel is cold rolled, pickled, and limed. The steel is obtained from large steel corporations and is known as cylinder stock.

About 10% of the troubles encountered in hot-dip tinning of milk cans and ice cream cans may be attributed to the quality of the steel. It is therefore very important to see that clean, sound steel is used.

It can readily be appreciated that there are three very important components to good tin coatings. These are the quality of the base metal, the quality of the tin used, and the skill, or technique in putting the molten tin on the steel. If one of the three is defective, it will make all three defective.

Raw Materials

Before discussing the actual hot-dip tinning operations for tin coating milk cans and ice cream cans, a few words should be said about the raw materials used in the process, and the equipment necessary to do the work. The raw materials consist of metallic tin, fluxing materials such as sal-ammoniac, white powdered sal-ammoniac, zinc ammonium chloride, zinc chloride, commercial cleaners, acids, glycerin, tinning greases, inhibitors, sawdust, whiting or plaster of Paris, clean rags, fuel oil, and sometimes tallow or palm oil, and paraffin distillate. Only a brief word can be said about these materials at this time.

The tin should be a very soft grade of *high quality* STRAITS TIN. Some of the other tins contain chemical elements that make the tin hard and brittle, and such tin often gives endless coating troubles. A few of the important facts about tin which should be known are as follows: It melts at 232° C. (449° F.); cast tin has a specific gravity of 7.28; liquid tin at the melting point 6.98. Purest standard cast tin has a Brinell hardness of 5.4. It has a specific heat of 0.0585, and a latent heat of fusion of 14.4 gram calories per gram. It weighs 455 lbs. per cubic foot; 0.263 lbs. per cu. in., and in the liquid tin bath weighs 436 lbs. per cubic foot. The impurities found in tin are antimony, lead, bismuth, copper, iron, and arsenic. Iron and antimony tend to make tin hard and brittle. At a temperature of 530° F., tin takes on a yellow color due to oxidation.

Before the work can be properly processed, it must be put through a good commercial cleaning bath. In pickling, both sulphuric and muriatic acids are used. A good inhibitor should of course be used in the pickling bath. After pickling, the work is fluxed and then put into the molten tin. Various kinds of fluxes are used in different plants. Some plants prefer a liquid flux of zinc-ammonium chloride after the work has been thoroughly washed after pickling, then on into a slag flux on the tin bath of the usual coarse or medium gray sal-ammoniac. Others use simply a zinc

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chloride dip with some white powdered sal-ammoniac in it. The sal-ammoniac flux on the tin bath is conditioned by the use of a very small amount of commercial glycerin.

One of the most vital factors of good tin coating by the hot-dip method is to always use a very high quality grease. A poor, low quality grease while perhaps having a low cost purchase price, is in reality exceedingly expensive in the end. Only the very highest quality prime tallows should be used. Paraffin distillate is sometimes used to remove the grease; some plants give the work a last dip in a water bath with a very high grade fuel oil on it. Cedar sawdust, powdered lime, pine sawdust, and very clean soft rags are used for wiping and cleaning the work. Alcohol and whiting, or gasoline and whiting are used to give it a beautiful clear shiny lustre before it is wrapped in heavy brown wrapping paper for storage.

Equipment for Tinning

The materials having been briefly discussed, the next feature of importance to examine is the equipment used. This varies very widely from plant to plant depending upon the scale hot-dip tinning is done. Small companies naturally do not have the elaborate equipment used in larger companies. Therefore to cover the equipment, a brief description of that found in some of the larger companies will be given, and remarks will be made from time to time qualifying it for the smaller companies.

In the larger companies, both the hot-dip tinning of new milk cans and ice cream cans, and the retinning of old cans are carried on with the same equipment. There are really two departments, a rough tinning department, and a finishing tinning department. The equipment in the rough tinning department consists essentially of two tin pots, cleaning solutions, and pickling solutions. The one tin pot is used as a dross treating tin pot, and also for remelting out the solder, etc. in taking old cans apart to be retinned. The second tin pot is a black tin pot, or a rough tin pot, in which the tin is of not very high quality, but is still good enough to put on the first rough tin coat.

Old cans usually have butter fats, etc. in the seams, and therefore before the cans are processed at all they must first be put through a cleaning solution. After this, they are rinsed clean, and then taken apart in the dross tin pot. The cans are tinned and retinned with no bottoms in them to speed up production, and give a higher quality product.

The rough tinning furnace is the usual type of furnace and may be heated with either coal, gas, or oil as a fuel. The tin pots are cast iron pots 30″ x 30″ x 24″ x 1¼″. The furnace is of brick with the usual angle iron bracing and tie-rods, and the design is of the Dutch oven type with the products of combustion passing around the pots and joining a common stack at the rear. The top of the furnace is covered with a $\frac{3}{16}$″ steel plate. There is a pyrometer showing the temperature of both pots at all times.

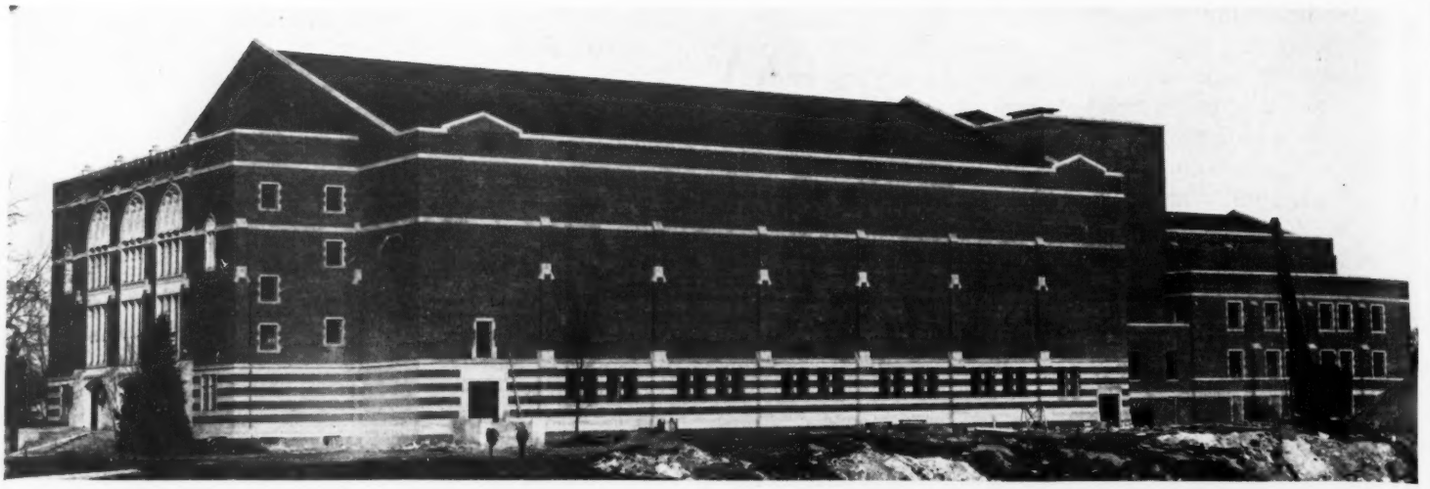
The rough tinning department serves two purposes, namely for reclaiming the by-products of tinning, and for taking old cans apart that are to be retinned. It is also used for retinning in the rough tin pot, hoops and those parts which have to have a first tin coat before going to the retinning department. The tin and lead pot has 1 to 2 inches of tallow on it, and is carried at a temperature of from 500° to 600° F. The work consists of two main divisions, the black stock to be rough tinned and the work that has come in to be retinned, old cans that must be taken apart, and the pieces tinned separately.

All cans have to be thoroughly degreased before attempting to pickle them or rough tin them. This operation is carried out in the can washer, or degreasing machine. All articles having any grease, or milk or cream deposits in the seams must be first degreased. The cans sent in to be retinned are then taken apart in the rough tin pot. Then the parts and the black steel parts are both pickled. The black steel parts such as breasts and other parts are pickled in sulphuric acid pickle while the tinned parts are pickled in the muriatic acid pickle. Both kinds of parts must be thoroughly pickled. All rust must be absolutely removed. After pickling, the parts are thoroughly washed, then given an alkali dip, and placed on a dryer. They are then given a very light acid dip and placed in the rough tin bath for the rough tin coat.

If gas or oil are available for fuel, the fires can be more closely controlled than with coke or coal. Hoops are tinned with a mixture of 75 parts tin and 25 parts lead, and the solder for the bottoms is 54 parts tin and 46 parts lead.

To appreciate the problems of tinning and retinning, it is necessary to again call attention to the steel base. There are four kinds of steel: that with a clean hard surface; that with light rust on it; that with heavy rust on it; and that with alkali on it. It can be seen at once that the condition of the surface upon which the tin is deposited is of prime importance. It is impossible to get a smooth tin coating on a rough surface. These facts should be kept in mind.

[Part 2 which follows describes the various steps in a typical production plant and the precautions followed to insure profitable work in tinning.]



The finished roof showing the long lengths of unbroken copper courses. Michigan State College also finished a field house of large size using 3-oz. copper.

3-Oz. Copper Roof Laid with 190-Foot Strips

IN laying the "double lock" (3-oz. copper) roof on the auditorium (Bowd & Munson, Lansing, architects) at Michigan State College, East Lansing, Michigan, the Michigan Sheet Metal Works of Lansing was given an opportunity to lay this light weight material in very long lengths.

Some 280 squares of cooper roofing were used on the building. The roof is double-pitched, without any breaks in the surface, and from end to end is about 190 feet long. The contractor was thus able to lay continuous lengths approximately 190 feet long and did so without any particular trouble.

As most contractors know, this "double-lock" roofing copper consists of pure copper strips of 3 oz. weight, backed up with 6 lb. chip felt, resulting in a material which is very flexible and tough. Advantage is taken of the material's flexibility and the copper strips are laid over short lengths of lath to obtain a slate-like or shingle texture. The curves take care of expansion and contraction. Additional advantages claimed are: high insulating value because of trapped air spaces between copper and sheathing; the durability of copper; low cost; fire and lightning safety; and elimination of special heavy supporting framing.

As the photographs show, the eaves are a parapet behind which there is a very wide gutter with inside drains. This gutter is built-up roofing laid to a point above the top of the parapet (see photograph). Beginning at the upper gutter edge the copper roof was laid in continuous courses to the ridge.

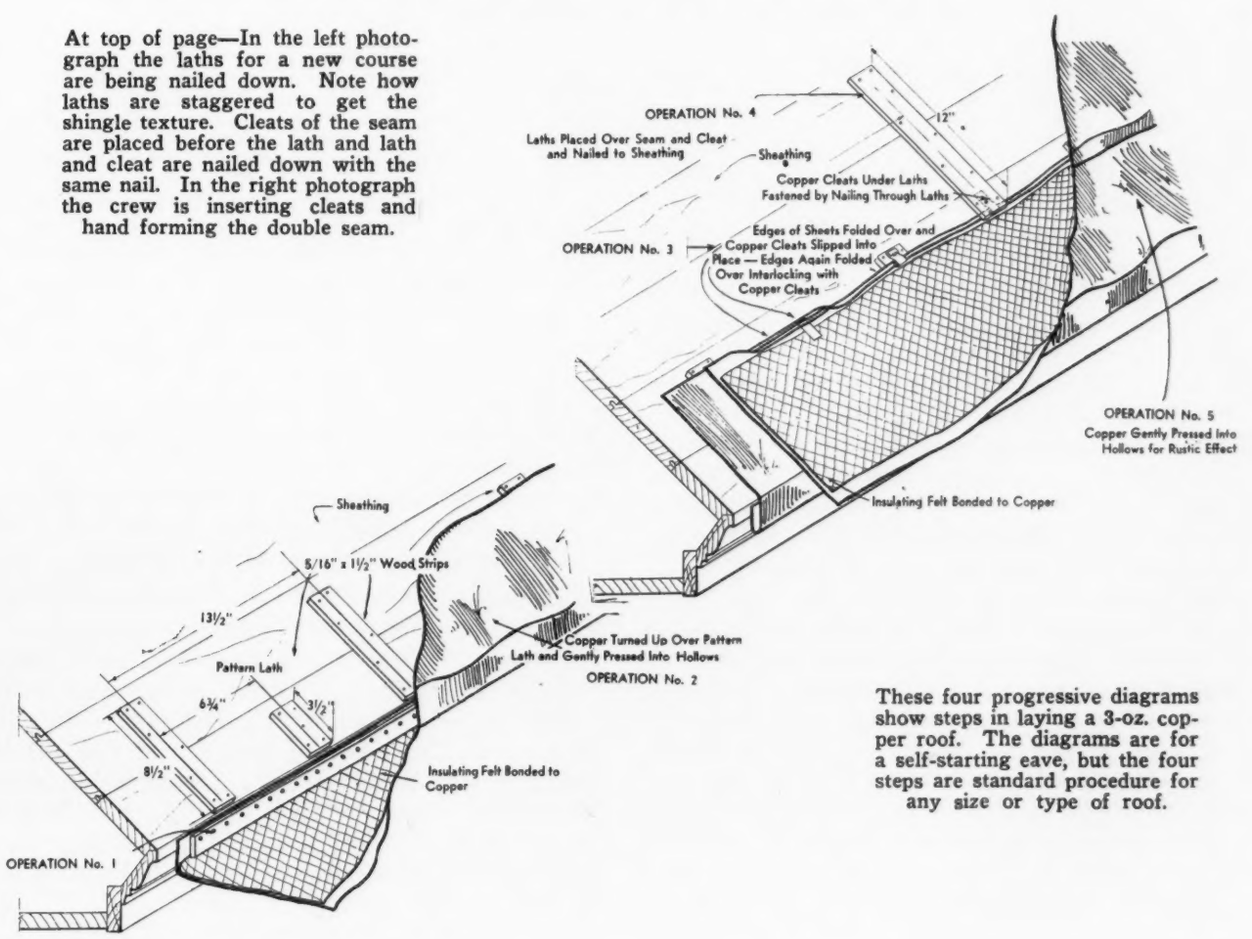
A crew of five or six men was used. As soon as one course was cleated down, the crew divided itself with three men nailing down laths for the next course and two men unrolling the strips of copper. Then usually two men inserted cleats in the seam between the two courses and nailed the cleats and the lath to sheathing while three men double-seamed the two courses by hand. These typical operations are shown in the photographs.

The double seaming was finished all along the seam and then the full crew turned the course up onto the roof ready to repeat the process. The men pressed the copper down between the laths after the second course had been double seamed and turned back.

As laid, the flexible copper is pressed down between laths to obtain the shingle-like texture shown in this photograph. The gutter is built-up roofing. The copper begins at a point higher than the top of the parapet. Copper strips are 190 feet long.

This roof was laid in cold winter weather with snow on the roof during much of the working time. The sheathing had been felted in the fall. Just after the roof was finished and before the heating system was finally balanced, the building was used. It snowed that afternoon and, with heat on, temperatures directly under the roof were probably about 120 degrees to obtain 70 degrees at the floor 60 feet below. It was observed that the snow was still on the roof two days later, indicating the insulating qualities of this construction.

At top of page—In the left photograph the laths for a new course are being nailed down. Note how laths are staggered to get the shingle texture. Cleats of the seam are placed before the lath and lath and cleat are nailed down with the same nail. In the right photograph the crew is inserting cleats and hand forming the double seam.


OPERATION No. 4
Laths Placed Over Seam and Cleat and Nailed to Sheathing
Sheathing
12"
Copper Cleats Under Laths Fastened by Nailing Through Laths
OPERATION No. 3
Edges of Sheets Folded Over and Copper Cleats Slipped Into Place — Edges Again Folded Over Interlocking with Copper Cleats
OPERATION No. 5
Copper Gently Pressed Into Hollows for Rustic Effect
Insulating Felt Bonded to Copper
Sheathing
5/16" x 1½" Wood Strips
13½"
Pattern Lath
6¾"
3½"
8½"
Copper Turned Up Over Pattern Lath and Gently Pressed Into Hollows
OPERATION No. 2
Insulating Felt Bonded to Copper
OPERATION No. 1

These four progressive diagrams show steps in laying a 3-oz. copper roof. The diagrams are for a self-starting eave, but the four steps are standard procedure for any size or type of roof.

Fluxes For Soldering*

By B. W. Gonser, D. Sc., and E. E. Slowter, M. Sc.

THE purpose of the flux used in soldering is entirely for preparation, as it does not form any part of the completed joint. So important is this preparation treatment, however, that far more joints are made unsatisfactorily because of improper choice or use of a flux than for any other reason. The whole subject of solder fluxes is still controversial and many conflicting claims are presented by those interested.

The essential requirement of any flux is that it should aid the solder to wet and ahere to the parts to be joined. This involves removal of any oxide or other surface film to permit that intimate metal-to-metal contact so necessary in making sound joints. In addition, a good flux forms a protective layer over the joint, thus excluding air and preventing further oxidation before the solder solidifies. A number of materials which satisfy these requirements cannot be used in many applications because they are corrosive and gradually destroy the joint or injure the material coming into contact with it, to say nothing of disagreeable effects on the operator.

Reprinted from "Tin and Its Uses," July, 1940; Quarterly Review of the International Tin Research and Development Council.

The Ideal Flux

The ideal flux should:

1. Remove surface films from the work and the molten solder.
2. Float upon the molten solder when making the joint to prevent further oxidation and flux inclusions.
3. Be applied easily and cheaply.
4. Leave no corrosive residue or by-products that will injure the joint.
5. Be non-injurious to materials coming into contact with the joint, non-injurious to flesh, and odorless and fumeless.

Investigators are still searching for this ideal flux. Zinc chloride or mixtures of zinc and ammonium chlorides, which are widely used industrially, satisfy the first three requirements admirably, but do not satisfy the last two. Rosin is a less effective cleansing-fluxing material, yet is widely used because of its non-corrosive, non-injurious nature. Thus the choice of a flux depends on the application and is usually a compromise between desirable and less desirable properties.

So many materials have been suggested for

solder fluxes that it is impractical to list all of them and comment upon their effectiveness. In general, they may be classed as inorganic and organic and subdivided into groups, of which typical members are listed below:

I. Inorganic Fluxes
   Acids
      (a) Hydrochloric
      (b) Hydrofluoric
      (c) Ortho-phosphoric
   Salts
      (a) Zinc chloride (zinc + hydrochloric acid)
      (b) Ammonium chloride (sal ammoniac)
      (c) Zinc-ammonium chloride
      (d) Miscellaneous, *e.g.*, magnesium, calcium and aluminum chlorides

II. Organic Fluxes
   Organic Acids
      (a) Oleic
      (b) Stearic
      (c) Palmitic } Obtained from fats such as tallow, lard, palm oil
      (d) Lactic
   Amines and Amides
      (a) Aniline
      (b) Acetamide
      (c) Ethylene diamine
      (d) Urea
   Rosin Fluxes
      (a) Rosin (resin, or colophony)
      (b) Special patented rosin-base fluxes
   Miscellaneous
      (a) Naphthalene tetrachloride
      (b) Mannitol and derivatives

The inorganic acids and salts are, in general, excellent for eliminating oxide films and exposing a clean, etched metal surface, and are quite stable under soldering conditions, but they are more or less corrosive and any excess should be carefully washed away to prevent subsequent trouble from corrosion. Phosphoric acid is an exception, as in some cases decomposition products are formed which resist further corrosion. The eutectic mixture of zinc and ammonium chlorides (about 3 parts zinc chloride to 1 part ammonium chloride) is particularly useful where a low melting flux is needed, as the mixture melts at 179 deg. C. (354 deg. F.), which is far below the melting point of zinc chloride alone (262 deg. C. or 504 deg. F.). A mixture of 10 parts zinc chloride and 1 part ammonium chloride is a very popular and widely used flux.

Non-Corrosive Fluxes

Organic fluxes are, as a class, weaker fluxes than the inorganic acids and salts, and any corrosion products formed are slower in their action. The organic acids are easily decomposed, yet some, like benzoic acid, are quite active for a limited time. Amines and amides are useful for quick spot soldering operations, since they are fairly active and either decompose quickly to comparatively harmless residues or volatilize completely. Rosin, the best known and most widely used organic flux, is only mildly active but is unusual in leaving a non-corrosive residue which is non-conductive and forms a hard, solid shell over the soldered joint, impervious to air and moisture. Some patented rosin-base fluxes attempt to combine the speed of an active acid flux with the protection of a rosin residue. As an example, a rosin flux containing 1.5 per cent aniline hydrochloride and 1.5 per cent solvent, such as glycerine or ethylene glycol, is said to release sufficient hydrochloric acid by decomposition to speed the fluxing action yet be comparatively non-corrosive.

Recent Developments

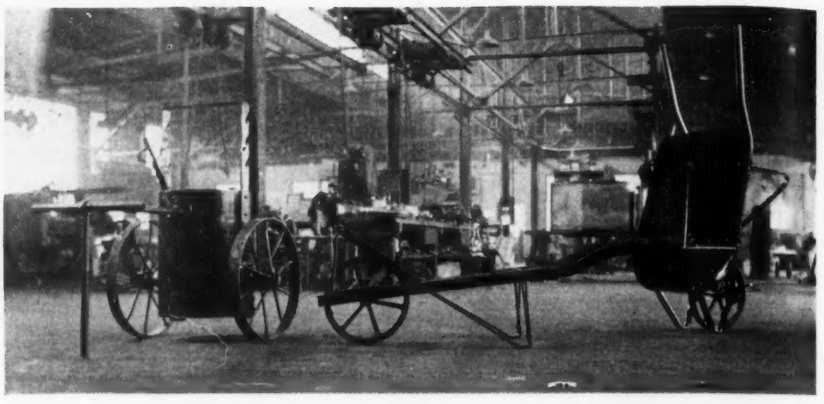
Among the new fluxes which show promise are mannitol, sorbitol and soluble derivatives of these materials. Mannitol is insoluble in most common organic solvents but can be used as a suspension or as a solution of one of its derivatives. Its non-corrosive, non-toxic nature is very desirable for some applications. Laboratory tests indicate it to be more effective in general than most other organic fluxes, but less effective than zinc chloride. Some work has been done on the use of vapor fluxes such as hydrogen chloride, but they have not yet proved to be economically feasible. Of real practical importance, however, is the use of organic wetting agents to increase the wetting power of solder fluxes. This has formed the basis of many patent and secret formula fluxes.

The Choice of a Flux

Various considerations determine the choice of flux for commercial soldering operations. A strong flux, like zinc chloride, is used for many purposes such as dip soldering of radiator cores, and bit soldering of brass, copper, bronze, zinc, tinplate, terneplate and iron. Rosin is used particularly in the electrical industry and can-making industry for joining tinplate, copper connections, etc. Tallow has a time-honored record for fluxing lead joints, block tin and pewter. Hydrofluoric acid is sometimes necessary to flux cast iron. A saturated solution of zinc chloride in 50 per cent hydrochloric acid is frequently recommended for soldering stainless steel, nickel and monel metal.

By the choice of suitable solvents or carriers most of the inorganic and organic fluxes may be prepared in cake, paste or liquid forms or as a core within solder wire. Commercial paste fluxes commonly consist of zinc chloride as an emulsion in vaseline or similar grease. Frequently solder powder is suspended within the flux in a grease or paste medum.

Left — Daisley-Doup & Co. plant is a large, modern manufacturing building equipped to handle light or heavy gauge materials.



Right — Left to right — A lead melting truck; pig iron barrow; coal or coke barrow—made in 10 to 16 gauge. Note well-lighted shop and plentiful machinery.

Wheel-barrows and Other Specialties

By R. C. Nason

RAY, DAISLEY & CO., Lindenhurst, N. Y., is an excellent example of an old sheet metal contracting company that successfully fills the needs of "heavy" industry with fabricated steel wheel-barrows and at the same time does a lucrative business in the usual gauges of sheet metal work. This interesting combination routes a good volume of air conditioning work plus all general activities in light gauge sheet metal including much experimental craftsmanship through the Ray, Daisley & Co. plant, and through Phillips, Doup & Co., a sister organization, the firm fabricates first quality items such as barrows, hoisting buckets, lead melting pots and like goods.

Firm Founded in 1852

The history of the two groups goes back to 1852 when John Ray opened his first shop in Brooklyn to conduct a general heating business. Later, in 1860, he was joined by Howard Daisley to change the firm name. Phillips-Doup started as steam heating contractors in 1892. About 1900 they began to manufacture wheel-barrows. In 1933 the two firms combined and since then the two divisions have manufactured a well balanced line of products ranging from 10 to 16 gauge for heavy industry and operated a fully equipped sheet metal shop for lighter gauges.

In tonnage the heavier gauge items lead, although light gauge finished goods exceed in quantity of items. Air conditioning occupies about 20 per cent of the work turned out in the sheet metal shop. Herbert Daisley, now general manager of the two companies and a great grandson of the founder, does the engineering. This he is qualified to do as he was an honor student at Bushwick Evening H. S. Vocational School 20 years ago and even now teaches sheet metal work evenings in the East New York Vocational high school.

Much of the activity in the light gauge sheet metal shop involves high class experimental work wherein intricate pattern calculations and great

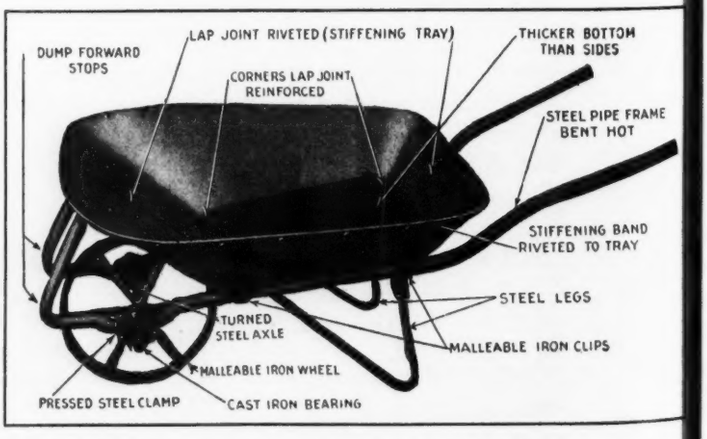


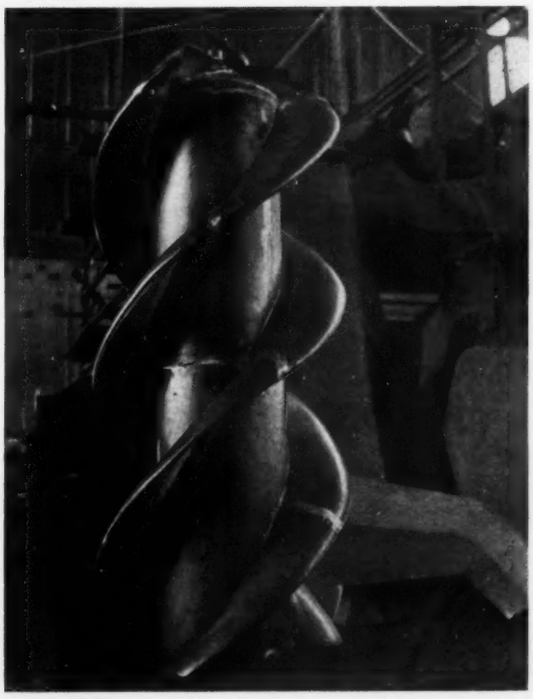
Illustration from company's catalog showing a coal barrow made complete in the shop except for wheel and bearing clamp. Arrows point to features of these barrows.

care in fabrication must be fulfilled. For example, there was recently fabricated as a pilot number a 16-oz. copper cabinet wherein a paint manufacturer will test samples of his products. The cabinet contains 16 cells for test slabs. Webs of the cabinet are hollow so that cold water may be circulated through them. In the base of the cabinet is a water basin with steam coil.

Steam heats water in the basin, steam rises through the cells and over the test slabs. In making contact with the cool walls drops of moisture are precipitated onto test samples. A vast amount of hand soldering was required by the sheet metal fabricator in this product.

Shop Does Experimental Work

Another unusual experimental piece is the screw type water pump made for an inventor and shown in a photograph. Full length, winding blades, each making a complete revolution, of 16-gauge steel, were brazed onto a 12-gauge steel cylinder. In service, the pointed end when immersed and rotated, does the pumping. To make the blades Mr. Daisley had to make patterns for a compound curve. Not alone do the blades spiral the cylinder, but the blades are concave and have cupped outer edges as well, forming cup-shaped scoops. Brazing was preferred to welding, to reduce any tendency to warp, although the fabricator has arc, acetylene and forge welding equipment.



An experimental 16-gauge steel water pump requiring compound curves in the patterns and brazing for assembly. This light gauge work is handled by the light sheet metal shop.

An all-copper paint test cabinet pilot unit used to establish manufacturing costs. The text explains how this cabinet operates.

◆

Barrows for Every Industry

One of the photographs shows a group of heavy gauge industrial barrows completed for a South American customer. Domestic users include steel mills, mining companies, public utility plants, apartment houses, large buildings of all classes, with special reference to fire rooms, plus dozens of other prospects who use heavy gauge fabricated metal barrows.

So strongly made are this company's barrows that Mr. Daisley recently examined one that had been in use for 40 years without repairs. In fabrication, the barrow bottom plates are power stamped on a large press. Laps in the plate, of sides and ends, also junction of handles and supports are performed mostly by power riveting. The turned steel axles are machined on three lathes in the shop. Mass production for this reason is avoided and all articles in the heavy-gauge shop, an area 100 by 125 ft., are virtually handmade.

Barrows in All Types and Sizes

The catalog issued by the company shows many styles of barrows—coal barrows in three grades and several sizes, square tray barrows, single and two-wheel models, foundry, coke, mining and apartment house barrows, dirt, sand, concrete, wharf and charging barrows. One also noted coal wagons as used in fire rooms, three-position drop wagons, tool carts and wagons, tubs and hoisting buckets as often seen at the end of an excavation hoist or crane. Then there are available tar, asphalt and lead melting furnace, concrete and coal carts, steel handtrucks and salamanders. Collectively the line uses 1,500 tons of steel plate yearly aside from sheeting used in the sheet metal shop.

The light gauge sheet metal shop adjoins the heavy plate department. Hand bench and floor machines are used here since power equipment is available "next door."

Machine tooling in the Daisley-Doup plant is unusually heavy and powerful. Shears, presses, riveters, metal saws and like equipment handle up to ½-in. plate. One squaring shear cuts with a single stroke a 2½-in. steel bar. The fabricator's three lathes already mentioned are flanked by a complete blacksmith shop. Here craftsmen perform what is referred to as forge welding, practiced in making handle ends and joining ends to supporting parts of many types of barrows. The operation duplicates old fashioned blacksmithing wherein the basic metal parts are white-heated then hammered together on anvils.

Tooling in the sheet metal department is equally complete although hand and foot power machinery is quite suitable. Shearing and heavy braking operations are performed as a rule in the heavy-gauge shop, separated only by a partition. Folding, flanging, edging, soldering, welding and like operations in sheet gauges from 16 to 26 are handled in the sheet metal shop on equipment there.

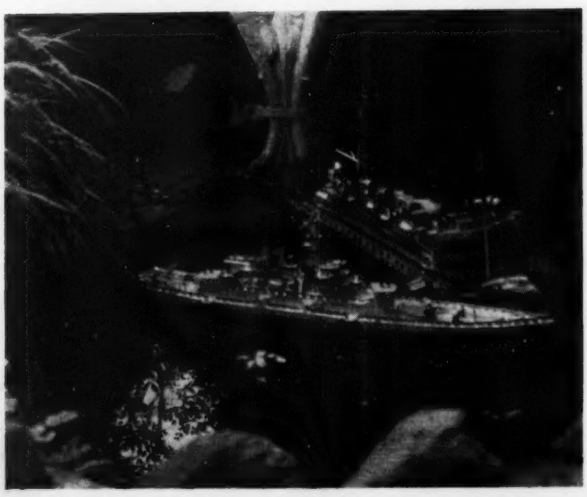
As already indicated, air conditioning is a favored class of business in the Daisley plant. To facilitate estimating Mr. Daisley recently worked out short-cut elbow and air velocity tables which reveal at a glance volume, velocity, pressure and duct sizes in a single reading when two factors are known.

In the Ray, Daisley-Phillips Doup & Co. shop the organization can and does daily handle a variety of fabricated work rarely found in average sheet metal shops. But in no case is there handled price competitive work. Things must be made this contractor's way, wherein good craftsmanship is paramount, price secondary. Evidently it is a good policy because after 88 years of continuous business experience this contractor-fabricator continues as during the past three generations of management.

Model Ships For a Fish Pool

A. Bretch's son, Charles P. Bretch, 520 S. Jefferson St., Dayton, Ohio, who does sheet metal work, roof repairing and spouting, furnace installation and repairing, fabricates dish washing tanks and trays and drain boards for restaurants and lunch rooms, as well as the vacuum cleaning of furnaces, has recently built two model ships of galvanized Armco iron, for the fish pool in his own back yard.

The Queen Mary weighs 30 pounds, while the USS North Carolina battleship weighs 20 pounds.



Where trustworthy tools are vital

Photo—American Airlines, Inc.

When you're a mile or two aloft you're not inclined to compromise on mechanical performance. That's why the aircraft industry, in all its branches, demands the best obtainable in materials, machines and tools. And, significantly, you will find Crescent Tools very much in evidence wherever planes are built, flown or serviced. In fact, you'll find them furnished as standard equipment by many leading aircraft engine manufacturers.

Crescent Tools include adjustable wrenches, pliers of all types, hacksaws, snips, screwdrivers, etc., etc. They are sold under the "Crescent" and "Crestoloy" trade names by hardware dealers and industrial distributors everywhere.

CRESCENT TOOL COMPANY, JAMESTOWN, N. Y.

YOU CAN ALWAYS DEPEND ON

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HERE'S AN OUNCE OF PREVENTION...

that's worth a TON of cure

When you build ductwork of Beth-Cu-Loy Galvanized Steel Sheets you're building corrosion-resistance right into the ducts. For Beth-Cu-Loy Sheets are protected from corrosion, not only by a heavy coating of zinc, but also by the addition of 0.20 to 0.30 per cent copper to the steel itself. According to impartial tests by the American Society for Testing Materials, the addition of this small amount of copper to steel more than doubles the life of sheets. That's an ounce of prevention that's really worth a ton of cure, and the added cost is only a few cents per sheet—a few dollars more on an entire installation. Give your customers the added protection and lasting satisfaction of Beth-Cu-Loy Galvanized Steel Sheets in all ductwork.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

Officers for 1941. Seated, left to right—Secretary Meyer, Vice President Varden, President Steinhorst, Treasurer Kirkpatrick. Standing, left to right—Directors Daniel, Little, Stevens.

Auxiliary officers, left to right—Treasurer Carfer; First Vice-President Clifford; President Stoner; Secretary Lighthart.

New York State's 18th Convention

THE New York State Sheet Metal, Roofing and Air Conditioning Contractors Association's eighteenth annual convention, held in Syracuse March 25, 26 and 27, enjoyed the largest registration in several past years and made available to contractors an interesting merchandise display as well as a comprehensive and practical program. Of interest, was the offering for the first time of cash prizes to contractors purchasing the largest dollar volume of products displayed at the convention. More than $7,000 worth of merchandise was bought by association members from manufacturers displaying equipment and products.

Influence of FHA

The program was nicely divided between technical subjects and subjects of general business interest. According to established custom, a luncheon was tendered on the first day to local architects, engineers and others indirectly interested in the warm air heating and sheet metal industry. At the luncheon, Mr. Robert Williams, Chief, Industry Section, Federal Housing Administration, Washington, discussed the influence of FHA in residential construction. Mr. Williams pointed out that housing is a very important factor in maintaining the American Standard of living and today is a very critical factor in the national defense program.

Whereas housing was virtually neglected except in trouble areas during the first world war, housing today is being advanced parallel with the establishing of our rearmament industry; whereas inflation became common in 1914, 15, 16 and 17 in residential building, economists today see no good reason for building material inflation of more than a minor advance; and whereas housing was of secondary importance in 1914-1918, today housing for rearmament workers is being considered even ahead of rearmament construction.

Mr. Williams reviewed some of the causes (like mortgage financing) which led to the establishment of FHA and outlined pointedly the changes which FHA supervision and mortgage guarantee have effected in the general mortgage and residential building picture. FHA, according to the speaker, made available ready money at low interest rates and has served as a co-ordinating influence to keep residential construction on an even and rising line. An important accomplishment of FHA has been the general stimulation of home buying and building by a co-operative advertising program participated in by

Left—Robert Williams of FHA (at luncheon for contractors, architects, builders, etc.) described FHA's influence and said he thought the National Housing Act will again be extended after the June expiration. Right—President Ballard and Professor Konzo at the full afternoon session given over to a presentation and discussion of the "Yardstick" by Professor S. Konzo of the University of Illinois.

manufacturers, contractors, and suppliers of equipment required in home construction. Modernization of existing homes has been a very large part of the FHA program and Mr. Williams assured contractors that quite likely both modernization and new construction clauses will be continued beyond the present June 30th expiration of the present FHA act.

Group Insurance Plan Successful

Probably the most important discussion of the convention centered around the association's effort to secure a minimum of $50,000 in premium for the group insurance plan launched at the 1940 convention. Following the 1940 convention, a group insurance plan managing firm was selected by an appointed committee and during the past several months, this managerial firm has established the group insurance plan on a sound and workable foundation. The minimum $50,000 in insurance has been secured; more firms have pledged co-operation on the expiration of present insurance policies; some larger firms which hesitated last year have now expressed a willingness to co-operate; many small firms have affiliated with the group insurance plan; so the project now looks completely satisfactory from all angles.

New York State contractors not familiar with this effort of the association may obtain full information from either association secretary Clarence J. Meyer of Buffalo or from Mr. William T. Haines of Lavereck & Haines, Inc., Buffalo, group insurance plan managers.

How to Select Registers

J. H. Van Alsburg of the Hart & Cooley Register Company, discussing "Registers—Why Use Them?" prefaced his discussion by pointing out that the contractor who sells on price alone spends far too much time in trying to save five or ten per cent by "buying"

J. H. Van Alsburg used this demonstrator to show how various types of registers direct air flow, control air velocity and set up varying resistances in the stack or branch.

The association's group insurance plan is well under way with required premiums in hand and more coming. Insurance Plan Manager Haines of Lavereck & Haines explained what has been done and what will follow.

whereas an equivalent five or ten per cent is quite readily obtained by selling a better or more attractive proposition. Also, that in bad times, the most successful contractors are those who sell something "extra" and it is the price selling organization which usually fails to weather any depression.

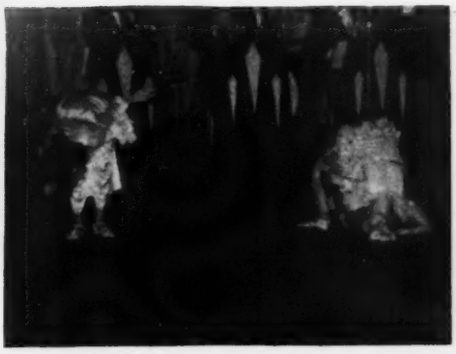
Of most interest in Mr. Van Alsburg's talk was the practical demonstration of the effect of different types of registers on air distribution. Mr. Van Alsburg had a small blower, duct, stack and register before which he placed a screen made up of very small paper units so that the air issuing from the register effected a readily noticeable movement in the small paper pieces across the face of the screen. Mr. Van Alsburg placed various types of registers on the stack head so that contractors might see how the air stream narrowed or broadened, moved up or down; right or left and how the different types of faces effected the velocity of air as indicated by the swing of the small paper pieces.

High Side Vs. Baseboard Location

Among the interesting problems of register selection, and application discussed by Mr. Van Alsburg was the selection of registers for baseboard or high side wall. High side wall registers, declared the speaker, need more careful selection as to type and register velocity in order that the air stream shall be properly distributed and shall carry to the facing wall and no further. Returns in rooms having high side wall registers may be either in the outside wall or in the inside wall under the warm air supply, both locations being satisfactory if the warm air register face velocity is correctly selected.

Mr. Van Alsburg declared that high side wall registers (inside walls) and returns at the baseboard on inside walls showed small temperature differentials between ceiling and floor and no cold floor draft if register velocity was properly selected and obtained. The solution to every problem of register selection and velocity, according to the speaker, is available in the register catalogs issued by all of the register manufacturers. The speaker suggested that contractors not choose their registers haphazardly or because they like a certain register, but select the type, size and the required velocity from the tables shown in these register catalogs.

Also of interest was Mr. Van Alsburg's discussion of the effect of turning vanes in a stackhead or register box. Comprehensive tests show that two turning vanes at the one-third line across the angle of the stackhead and extending sufficiently far down into the stack to equalize velocity will secure uniform register face velocity almost regardless of the type of register selected. Dampers in branch pipe were



There were two nights of entertainment. A father and son dancing team (left) was good. So were the dancing sisters in their "rag doll" act (center) and the acrobatic dancers (right).

suggested by the speaker for the purpose of balancing the system and dampers in the return system for balancing were recommended.

D. D. Hamilton of the Koppers Company, speaking on "Better Built-Up Roofs," declared that the use of a bond has done more to lower the standards of built-up roof construction than any other factor. The result of this has been that the customer buys a bond and not a roof, so the elimination of bonds would bring back the responsible roofer who is willing to guarantee his own work. Government purchasing of built-up roof has followed the practice of awarding the contract to the lowest bidder regardless of construction offered, and the roofing industry is today attempting to standardize government roofing specifications. Flashing, declared Mr. Hamilton, is another subject which badly needs revision and the preparation of new and more comprehensive specifications. The speaker pointed out that the old practice of installing cutoffs at every twenty squares is today being discontinued in favor of cutoffs at the end of each day's work particularly on insulated roofs.

Impurities in Copper Lengthen Life

Dr. R. A. Wilkins, vice president of Revere Copper and Brass Incorporated, discussing copper problems, declared that copper in general has been purchased for three prime qualities: 1—its high thermal conductivity; 2—its high electrical conductivity; 3—its resistance to corrosion. Since the electrical industry has for many years been the largest user of copper and demanded as nearly pure a copper as possible, the copper industry in general has aimed primarily to obtain a practically pure copper. However, architectural applications of copper in recent years have seemed to indicate that this 99.9 per cent pure copper might not be the answer to corrosion problems and, accordingly investigations were launched to determine why copper roofs applied fifty, a hundred or two hundred years ago seemed to withstand the elements better than many modern roofs.

Some of the causes for failure were traced directly to present day improper and ignorant application practices, but this investigation also disclosed that old time copper contained small percentages of some impurities which might effect the corrosion resisting qualities of the metal. Some parallel investigations on Duraluminum in age-hardening characteristics showed the benefit of small percentages of impurities and when this line of research was followed up it became evident that such small impurity percentages con-

(*Continued on page* 116)

Left—Dr. R. A. Wilkins said "too-pure" copper has been found susceptible to corrosion faster than copper with a slight arsenic content. "Impure" copper is not the solution to all exposure problems and correct mechanical application is still very necessary.

Right — Homer Brundage, Kalamazoo, Michigan, told members about Michigan's furnace and roofing divisions and how Michigan stages conventions and attracts and holds contractor interest.

Pro-rate Your Overhead—

and departmentize your operations if you want to know where you make and where you lose money

By Arthur Roberts

BENDIX AND THOMPSON, warm air dealers and sheet metal contractors at Union Falls, made money and lost money this past year. Sounds paradoxical—nevertheless, it is true. An analysis of their records showed that they made $2,400 net profit on the business as a whole, but lost $344.40 in the sheet metal department. The other departments were carrying this "weak sister."

When we disclosed our findings to Phil Bendix, he exclaimed, "We keep departmental records of sales, cost of sales and margins. We charge direct expense, such as rent, insurance, depreciation and repairs to the departments involved and the books show that every department is holding its own. Indirect expenses are not pro-rated but charge to an account called, 'General business administration.' We watch our expenses closely. Last year they were $6,120 or 9 per cent of $68,000 sales, which is a safe ratio, and since we made $2,400 after deducting these expenses plus salaries for Thompson and myself, it indicates that the business is being managed efficiently. Please explain how you figure we lost $344.40 in the sheet metal department."

As we explained it to Bendix, we now explain it to you.

Overhead Is Either Direct or Indirect

Overhead expenses fall into two groups for pro-rating—direct and indirect. The former are clearly applicable to one or more departments; the latter, such as office expense, owner's salary and delivery expense, are non-applicable to any one department but are chargeable to the business as a whole. Nevertheless, these expenses must be pro-rated in some way to the various departments to arrive at true departmental profit. Because the indirect expenses are pro-rated indirectly, they are given that name.

Expenses Must Be Charged to Production

All expenses ultimately must be charged to income-producing departments because they are the only sources that can recover these charges. Many warm air dealers and sheet metal contractors, like Bendix and Thompson, handle direct expense properly but consider indirect expense as one total instead of pro-rating it to income-producing departments, hence, they never ascertain the relative strength of their departments and manage them "in the blind," a condition doubly dangerous to success because these merchants assume that departmentization assures them profits.

From a study of this subject, we find that the recording of direct expense gives little trouble but the indirect expenses often confuse. Much of this confusion, as with depreciation, is engendered by the many involved discussions, verbal and printed, anent pro-rating, allocating, distributing or apportioning overhead expense. Warm air dealers and others employing labor, are advised to distribute overhead according to labor hours, machine hours, prime cost, unit of sale or output, upon an experience percentage basis, according to payroll, upon materials, to pro-rate selling ex-

TABLE I

Departments	Sales	Cost of sales	Gross margin	Direct expense	Indirect expense	Net profit	%
Oil burners	$ 7,200	$ 4,680	$ 2,520	$ 1,531.60	$ 673.20	$ 315.20	4.4
Coal stokers	18,400	14,720	3,680	2,270.80	979.20	430.00	2.3
Sheet metal work	4,600	2,530	2,070	1,680.00	734.40	344.40*	7.5*
Warm air installations	24,600	15,990	8,610	5,171.60	2,203.20	1,235.20	5.0
Repair sales	4,800	2,880	1,920	1,274.00	550.80	94.10	2.0
Air conditioning sales	8,400	4,400	4,000	2,352.00	979.20	669.90	8.0
Totals	$68,000	$45,200	$22,800	$14,280.00	$6,120.00	$2,400.00	...

*Loss.

penses on a basis different than the proration of other overhead expenses, etc.

No wonder that many warm air dealers and sheet metal contractors assume that the pro-rating of indirect overhead expense is intricate and costly, hence, let it slide to do only a half-baked job as Bendix and Thompson did. Accountants differ on the methods of allocating overhead expense; there are different schools of thought on the subject, reliable and accurate overhead distribution is a matter of dispute and doubt. However, by means of many field tests and years of experience on the accounts of heating and sheet metal contractors, we have established that the following method is simple, accurate and most applicable to this field.

Bendix and Thompson's accounts make an excellent case study because they are indicative of so many other dealer accounts in this industry, which pro-rate overhead expense incorrectly. Bendix and Thompson's condensed profit and loss statement for 1940 was as follows. We eliminate cents and use round figures for clarity:

			%
Sales		$68,000	100.0
Cost of sales		45,200	66.5
Margin of profit		$22,800	33.5
Direct overhead expense	$14,280		
Indirect overhead expense	6,120		
Total overhead expense	$20,400	20,400	30.0
Net profit on sales		$ 2,400	3.5

The direct expenses were properly distributed to the 6 departments, the indirect expenses were combined under one account called "General business administration." This routine is good accounting as far as it goes, but after the indirect expenses had been totaled in one account, they should have been allocated to the various departments on the same percentage as the direct expense. This procedure confuses many because it seems involved, but it can be reduced to simple fundamentals. Here's how.

Bendix and Thompson's direct expenses were departmentized on their books as follows:

Departments	Direct expense	%
Oil burners	$ 1,531.60	11
Coal stokers	2,270.80	16
Sheet metal work	1,680.00	12
Warm air installations	5,171.60	36
Repair sales	1,274.00	9
Air conditioning sales	2,352.00	16
Total direct expenses	$14,280.00	100

The percentages represent each department's proportion of direct expense to total. To arrive at the proper allocation of indirect expense, we pro-rate this total with the same percentages to the same departments, basing the computation on $6,120 instead of $14,280, using round figures.

Departments	Indirect	%
Oil burners	$ 673.20	11
Coal stokers	979.20	16
Sheet metal work	734.40	12
Warm air installations	2,203.20	36
Repair sales	550.80	9
Air conditioning sales	979.20	16
Total indirect expenses	$ 6,120.00	100

Recap of B-T Operations

Now, for the final recap of Bendix and Thompson's departmental accounts with the indirect expenses ($6,120) properly pro-rated instead of being deducted in one lump sum. (See Table 1.)

The foregoing analysis shows how important it is to pro-rate overhead expense properly, both direct and indirect. By making all departments carry their fair share of expense, an analysis of the accounts will reveal to Bendix and Thompson at any time the relative value of each department as a profit-builder and that is what they want to know. But this is not revealed unless all expense items are properly distributed.

The foregoing breakdown shows that the firm lost 7.5 per cent on sales in the sheet metal department, figuring the percentage-on-sales return; that the stoker department made the lowest net, 2.3 per cent; and air conditioning sales were most profitable, 8 percent. However, from the standpoint of dollars and cents, repair sales were low with $94.10 net profit and warm air installations high with $1,235.20 net profit.

To manage a business intelligently, this detailed information is necessary and it can be acquired only through allocation of overhead expense plus, of course, departmentization. With such detailed information available, Bendix and Thompson can take steps to increase the net on the low-profit departments, eliminate the loss on sheet metal work and promote air conditioning sales energetically to get the long profits, which may entail an increase in advertising appropriation for this department or employment of additional salesmen.

Pro-rating the overhead does not involve the bookkeeping procedure unduly. Those who departmentize their direct expenses have only to make a Journal entry transferring the total of indirect expenses to the various departments on a percentage basis as shown here. Those who do not departmentize need only add departmental columns in the journals and departmental pages in the ledger. Little additional book work is involved for the many advantages of departmentization and complete allocation of overhead.

Retiring president Glen Rynbrand (left) greets incoming president Jack Sherk, of Detroit.

Michigan Proposes State Licensing of Heating Dealers

THE most important question discussed at the 30th annual convention of the Michigan Sheet Metal, Roofing, Heating, Air Conditioning Contractors Association held March 4, 5 and 6 in Kalamazoo, centered around means for improving the general standards of design and installation of warm air heating systems. There were two principal discussions—the first conducted by J. Biddle, who presented to contractors and led the discussion of Michigan's proposed state licensing bill; the second discussion centered around the new Yardstick of the National Warm Air Heating & Air Conditioning Association as presented by George Boeddener, managing director of the association, and Professor S. Konzo of the University of Illinois, author of the Yardstick.

Law Should Bring 5 Advances

In presenting the proposed law for consideration by the convention, Mr. Biddle explained that preliminary promotion of the law began about two years ago. Detroit and Michigan contractors favored the act to license all installers of warm air heating plants and during the early promotional efforts some manufacturers operating in Michigan co-operated while other manufacturers opposed the bill. Meetings held within the last year show, according to Mr. Biddle, that most manufacturers now favor the act. The manufacturers, at the insistence of contractors, have appointed a committee, whose duty it will be to acquaint all manufacturers with the purposes and regulations incorporated in the law and obtain from all manufacturers either an agreement to co-operate or a decision to oppose the bill. Mr. Biddle said that the contractors alone, without the co-operation of the manufacturers, probably will not be able to secure passage of the act; therefore, the contractors' committee has put forth every effort to secure such co-operation.

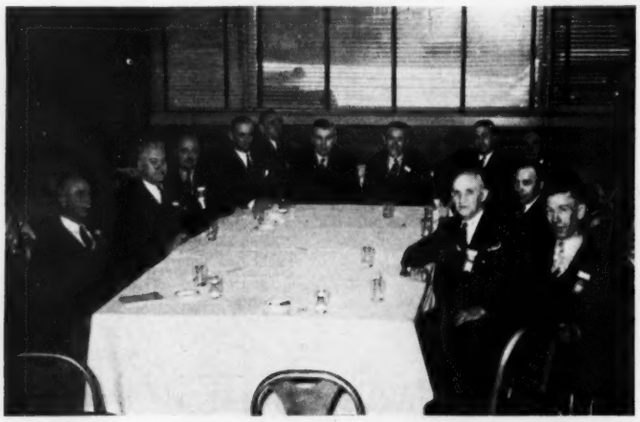
Mr. Biddle emphasized that the passage of the licensing act will not bring Utopia to the heating industry, but the act should do five positive things, as follows:

1—It will decide definitely who is and who is not a contractor;
2—It will keep out of the heating industry many of Michigan's seasonal employees;
3—It will compel all installers to live up to minimum reasonable regulations;
4—It will afford some recourse against "gyp operators";
5—The act will protect the public interests.

Bill Is Not a Heating Code

Mr. Biddle further explained that the Michigan legislature has always held that the legislature can not delegate regulatory powers to any body over which the legislature has not direct control. Therefore, any such licensing act must incorporate complete rules and regulations or, in other words, a complete heating code, if the act is to do anything more than simply license operators. The next step will be to incorporate in the act one of the actual codes now in existence.

It was unfortunate that copies of the bill could not be distributed before the meeting in order that contractors could study the provisions of the act. Mr. Biddle suggested that contractors take the copies home and study them in detail and submit to him any



Left—1940 Chairman of the Heating Division, Henry Delnay; chairman for 1941 John Sweet and Jay Biddle presided over the session devoted to discussion of Michigan's proposed state licensing law. Right—The roofers formed a preliminary division under P. O. Wierenga (chairman) and Adam Martin (secretary). New officers are at the head of the table.

Left to right—Dr. Siebert explained how this war differs from the last and made quite a case for "all-out" assistance to Britain. George Boeddener, Managing Director, National Warm Air Heating & Air Conditioning Ass'n said warm air heating will not engage in a name calling contest with the radiator industry. Professor S. Konzo introduced and explained the "Yardstick."

suggestions for changes in the act as it now stands. Contractors who did not attend the convention, but who are directly interested in a licensing act for Michigan should obtain a copy of the act from Mr. Biddle whose address is Ft. Shelby Hotel, Detroit.

Briefly, the act as now prepared, defines gravity and forced warm air heating and establishes a state administrative board consisting of the State Fire Marshall, the head of the department of engineering of Michigan State College and six other resident members, citizens of the United States, to be appointed by the Governor, as follows: One representative of an underwriters' inspection bureau operating in the state; one person from each of the described districts into which the state is divided, this individual to be a representative of a recognized firm engaged in the business of gravity warm air heating or air conditioning.

Five Control Districts in State

The state is to be divided into five districts for enforcement. The board appointed shall employ an executive secretary, investigators and other necessary personnel. The board shall grant licenses to applications who show proper qualifications and pay the prescribed fees; shall prepare an examination upon which the licensing is based; and shall police the law. The board is empowered to adopt and publish minimum standards prescribing rules and regulations necessary for the installation, repair, alteration and extension of warm air heating and air conditioning systems. Three classes of licenses are prescribed—first a license covering gravity warm air heating; second, a license covering air conditioning installations up to a maximum register output of 250,000 Btu.; and third, a license for installations above 250,000 Btu. License fees for the three classifications shall be $25, $35 and $50 respectively.

Before January 1, 1942, the legislative body of each city and village in the State of Michigan, having a population of 5,000 or over, and each township or portion thereof, having a population of 30,000 or more shall prescribe rules and regulations to be minimum standards covering the installation, repair, alteration or extension of the three types of heating described above. These local boards will also employ inspectors and other necessary personnel. The bill then explains the qualifications for inspectors, the authority of inspectors, means of inspection, and approval, disposition of fees, records of boards, penalties, and other necessary legislation.

The "Yardstick"

Managing Director George Boeddener outlined briefly the research activity of the association during the past 20 years; the activities of the publicity and promotional committees, and the other committees in the association, actively operating to promote manufacturer and dealer relationships and the general betterment of the warm air heating industry.

Mr. Boeddener also called attention to some of the unethical publicity being issued by the radiator heating industry and declared that the warm air industry will not stand for such unethical practices without protest, but the warm air association does not expect to engage in any name-calling contest. Mr. Boeddener

Left—President elect of the salesmens auxiliary for 1941, Jim Vanassche; Vice President James Morrissey; Secretary-Treasurer John Behler; Sergeant-at-Arms G. Jacobs.

Entertainment in the Michigan manner. Mostly girls, mostly peppy, kept the members occupied both evenings of the convention.

then introduced Prof. Konzo, who discussed the Yardstick.

Prof. Konzo declared he believed that closer cooperation between local and state associations and the National Warm Air Association is desirable. He suggested that perhaps a meeting between the National officers and directors and the officers of all local and state associations at the June meeting of the National Warm Air Association in Chicago might be distinctly beneficial to the entire industry.

Mr. Konzo pointed out that there is a distinct difference between "chizeling" as ordinarily applied to unethical practices and ethical ways and means of reducing the cost of installing a warm air heating plant. The "Yardstick" is intended to point out what is really "chizeling" and show what are ethical ways of reducing costs. The Yardstick also takes cognizance of the fact that in years gone by, people wore more clothes, they were not quite so critical of their heating plants, they permitted a wider margin of operating satisfaction whereas today, the public is distinctly more critical and has been taught to expect the ultimate in warm air heating comfort. Prices have been falling continuously for many years and workmanship in many localities has been sliding downward. These have resulted in decreased value to the public and it is for the purpose of acquainting the public with minimum standards that the Yardstick was prepared.

Mr. Konzo then went through the Yardstick in detail pointing out how Class A, B and C systems can be distinguished; how the Yardstick will enable the home owner to determine just what type of system is proposed; will make it possible for the contractor to emphasize how good his system actually is according to established standards; and will tend to set up the distinct features which distinguish the three types of systems outlined. Copies of the Yardstick were distributed to the members for study. Michigan contractors who have not yet received copies of the Yardstick should ask for copies from the manufacturer of the furnaces they handle. If the manufacturer is not a member of the Warm Air association, copies may be obtained from the office of the National Warm Air Heating and Air Conditioning Association, 145 Public Square, Cleveland, Ohio.

Roofers Form Preliminary Division

In the Michigan Association, a separate period for discussion is given to contractors who operate mainly in the roofing trade and accordingly, a roofers' session was held during the convention. The session was under the guidance of James Eby and association secretary, Gene Spraker. These two men produced a list of subjects for discussion one of which is the problem of bonding roofs. Whether to bond roofs according to usual practice or to issue a flat two-year guarantee was a question which was not settled, but it appeared as though most of the contractors at the meeting were in favor of the contractors' two-year guarantee.

The proposition of drafting definite specifications

(*Continued on page* 130)

Association Activities

Florida

The Roofing and Sheet Metal Contractors Association of Florida sent a letter to fellow members on March 6, reminding them that they will be expected to attend the annual convention to be held at the Roosevelt Hotel, Jacksonville, on April 18 and 19, to help chart plans for closer association.

Members are invited to bring their wives. Plenty of entertainment is promised, especially for the ladies.

Mark Fillingham, president.

◆

Milwaukee

The following is a list of the tools required to be carried by all mechanics, approved and agreed upon, jointly and severally, April 1, 1941, by the Milwaukee Sheet Metal Contractors Association and Sheet Metal Workers Union Local No. 24, A. F. L.:

Rule
Snips, Mi Wiss
Snips, Regular
Snips, Circular
Snips, Pipe
One No. 14 Crescent Snips
12 in. Dividers
Small Spacing Dividers
Small Pinch Bar
Hack Saw Frame, no blades
Prick Punches
Scratch Awl
No. 7 to 00 Rivet Sets
Putty Knife
Wrench for Stove Bolts
8 in. double end Adjustable Wrench
Screw Drivers
4 size Cold Chisels
Level
Plumb Bob
Scraper
Trowel
1 Peening Hammer
1 Riveting Hammer 1¼ lb.
1 Large Hammer 2½ lb.
1 set Rivet Punches
Mortar Chisel
2 Pliers (small & large)
1 Flat Nose Pliers
1 Round Nose Pliers
Reamer
Trammel Points
12 in. Adjustable Square
Dolly
Keyhole Saw
Wood Chisel
1 Parker Kalon No. O.X. metal punch
Cutting Tools

NOTE: all tools must be in **good condition.**

Paul L. Biersach, Secy.

◆

New York City

At the March 26 meeting of the Roofing and Sheet Metal Crafts Institute, at the Hotel Sharon, New York City, Mr. Ryan of the State Insurance Fund addressed the institute on Group Workmen's Compensation.

William Jettleson delivered an address on his anxiety and the desirability of the Institute adopting or going in for Workmen's Compensation Insurance covering only Institute members. The Institute is guaranteed a saving for members of at least fifteen percent on Workmen's Compensation and the speakers pointed out that savings ran as high as sixty percent on some groups. Members were enthusiastic about the plans presented and the entire matter has been referred to the Board of Directors which is considering the plan.

The Board of Directors is considering taking in as affiliates other associations now functioning in different parts of the United States and giving to them the benefits which our members derive both under our insurance certificate on work our members do, as well as the other privileges.

The bill to amend the labor and penal laws of the State of New York which we got behind in New York City has passed the State Senate and we were informed by our Legislative Committee that the Assembly will undoubtedly pass it within the next few days. This bill tends to make jobs more safe and will result in savings on liability insurance.

The bill affecting sheet metal workers which is now in the New York State Legislature is awaiting action of the Legislature. Our Institute has gone out solidly against the bill and has been urging the legislature to defeat it. It seems that there is every likelihood that the bill will be defeated if brought out upon the floor.

Irving Payson Zinbarg, Exec. Secy.

◆

Michigan

One of the quite important things discussed at our recent convention was the matter of manufacturing light weight roofing felts.

The Association went on record as being opposed to the manufacture and sale of any felts other than those of fifteen (15) pounds and thirty (30) pounds in weight.

All manufacturers have been notified of our action, and some reactions have been received, most of them are favorable.

E. C. Spraker, Secretary.

◆

Boston

The Sheet Metal Construction Division of the Construction Industry, has a standard form of union agreement between the Associated Ventilation Sheet Metal Contractors of Boston, The Master Sheet Metal Workers and Roofers Association and the Sheet Metal Workers International Association, Local Union No. 17 of Eastern Massachusetts and Rhode Island. The agreement covers employment, wage scale and working conditions of journeymen sheet metal workers and registered apprentices, parties to and recognized under the agreement.

The wage rate for mechanics has not increased and is still $1.50 per hour. There is a growing shortage of mechanics and they are very scarce in this area.

Both parties to the agreement agree to establish a Joint Adjustment Board with equal representation thereon, to hold regular or special meetings as circumstances may warrant. To the board shall be referred all matters of controversy or dispute arising out of the operation of the agreement. If this Joint Adjustment Committee be unable to adjust or settle any controversy or dispute, such matters shall be referred to one representative chosen by the employer and one representative chosen by the Sheet Metal Workers International Association for final adjustment or settlement by conference, negotiation or arbitration as may be mutually agreed upon by them, and pending such adjustment or settlement, there shall be no cessation of work by strike or lockout by either party to this agreement.

Apprentices are under the supervision and control of an Apprentice Committee of four members—two selected by each party to the agreement. Employers are entitled to apply to the Joint Apprentice Committee on the basis of one apprentice for each four journeymen.

Applicants for apprenticeship shall be between 16 and 21 years of age and each registered apprentice shall serve an apprenticeship of five years, with a graduated wage scale for apprentices.

All parties to the agreement agree to cooperate fully in every legal way to establish and maintain in the sheet metal contracting division of the construction industry and within the territory in which they shall operate, a code of ethics and fair practices which will insure compliance with the specific terms of the agreement and to direct their efforts individually and collectively to the elimination of unfair competition and destructive practices.

Mary D. Cotter, Assistant Secretary.

New Products

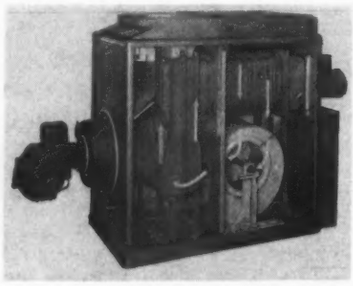
For your convenience a number has been assigned each item. Circle the items in which you are interested on the coupon on page 102 and mail to us.

● Indicates product not listed in 1941 Directory.
△ Indicates manufacturer not listed in 1941 Directory.

45—Climatemaker Oilbilt

American Foundry & Furnace Company, Bloomington, Illinois, announces the No. 115-J Climatemaker Oilbilt with an improved large design heat transfer service. The unit is designed for oil and with fan forced circulation built in. Filters are of the permanent, dry wire type.

The Oilbilt is cast iron construction, bolted and gasketed together.



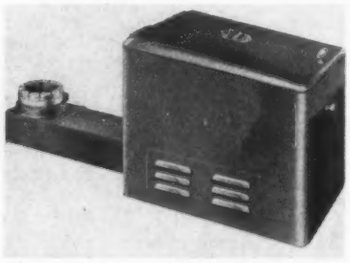
The Built-in blower-fan is arranged for summer air circulation. A sensitive room thermostat stops and starts the oil burner. When the furnace is warm, the fan starts. A high limit control stops the oil burner, but the blower continues to run. When the room thermostat is satisfied, burner and blower both stop.

Capacity of the 115-J is 115,000 Btu at the register.

◆

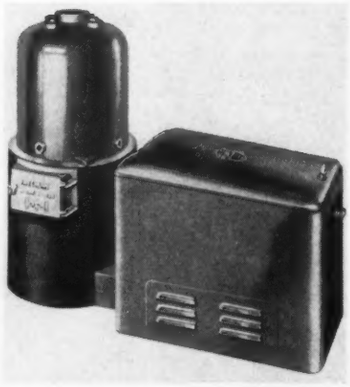
46—Freeman Baby

Illinois Iron & Bolt Company, 918 S. Michigan Ave., Chicago, has added the Freeman Baby stoker to take care of the average small home of 5 rooms.



Features include the extended wind box to permit easy cleaning under the retort, continuous gear driven transmission, rubber motor mounting of special Freeman design, segmented tuyeres, repulsion-induction motor, large capacity hopper and the Freeman Fire-Stabilizer, which keeps the fire bed at an even level.

Finish is a Colonial blue.



●47—Water Heater

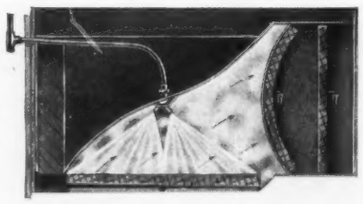
Freeman Stoker Division, Illinois Iron & Bolt Co., 918 S. Michigan Ave., Chicago, announces the new Freeman stoker-fired water heater, in several sizes, and especially designed for stoker-firing in combination with the new model T-2 Freeman stoker.

◆

48—Airstream Air Cleaner

Airstream Filter Corporation, 2100 Washington Avenue, St. Louis, offers the Airstream Air Cleaner—a constant flow fluid type, self-cleaning filter unit—for all kinds of commercial and industrial applications.

The principle of operation includes dense Fiberglas mats consisting of one contact mat and two eliminator mats.



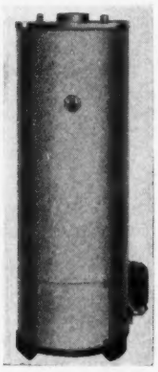
On the top or outlet surface of the contact mat there is distributed, through special nozzles that provide complete distribution over the entire surface of the mat, a constant supply of fluid, which flows downward (counter to the upward flow of the air) producing constant saturation of the mat with the fluid, and since the fluid leaves the mat at the intake face heavy deposits are automatically washed away.

The Airstream air cleaner is built in cells having a face dimension of 30 x 30 in. Cells are designed so they can be assembled in multiples. Each cell has a capacity of 3000 cfm.

49—Gilco Water Heater

The J. L. Gillen Company, Dowagiac, Michigan, offers the Gilco automatic oil-burning water heater, using a natural draft burner. Pilot flow is approximately 1 cc. per minute.

A feature is the draft-o-lite, furnished as standard equipment—a combination 90 deg. elbow and automatic draft regulator.

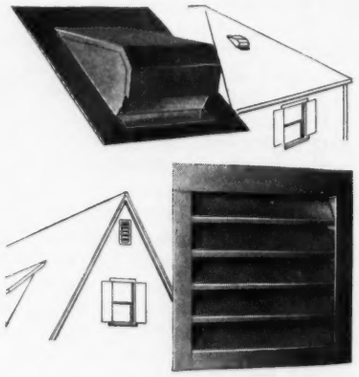


There are 4 sizes of Gilco water heaters—20, 30, 40 and 50-gallon storage capacity—all 51 inches high, and 16, 18, 20 and 22-inches in diameter respectively.

◆

50—Slant Roof Louver

The Leslie Welding Company, 2943 Carroll Avenue, Chicago, manufacturer of all metal vertical wall louvers, has added a new Universal slant roof louver to their line of 26 ga. copper bearing, galvanized steel. A 16-mesh bronze fly screen is provided and a baffle inside the louver protects from rain.



New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 102.

51—Visaflame Control

The Mercoid Corporation, 4201 Belmont Avenue, Chicago, announces the Visaflame control — a light actuated mercury switch designed to operate in conjunction with Mercoid safety

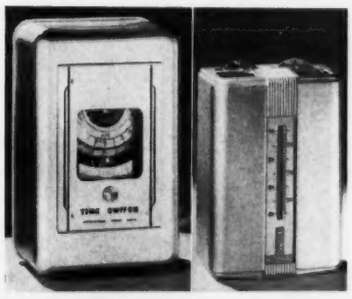
control panels as a power, ignition and flame failure shut-off for domestic and industrial oil burners.

The Visaflame control is a gas filled hermetically sealed glass bulb containing a mercury pool at the bottom with one immersed electrode. The other electrode contains two opposing bimetal coils arranged to compensate each other for ambient temperatures. The circuit remains closed in the presence of light from the flame—open in its absence.

◆

52—Time-Switch — Thermostat

Perfex Corporation, 415 West Oklahoma Place, Milwaukee, offers a 24-hour time switch and a Twin thermostat — a combination used frequently as an automatic day-night



temperature control set for domestic heating. The time switch has a 24-hour dial with adjustable indicators for setting the intervals of automatic switching.

Both time switch and Twin thermostat are finished in light gold.

53—Fan Cooled Motors

Century Electric Company, 1806 Pine St., St. Louis, announces a new line of improved, totally enclosed fan-cooled motors — both in appearance and internal design.

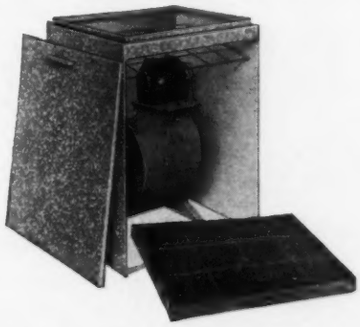
These new motors provide protection where the air is foggy with metal cutting solutions or there are abnormal quantities of metallic, abra-

sive and other dusts in the atmosphere that would ordinarily injure or clog the windings of a general purpose open motor. A generous quantity of cooling air is forced through the large air passages by the non-sparking fan. The air intake passages are not easily clogged and so designed that a 5/16 in, rod will not pass through them.

◆

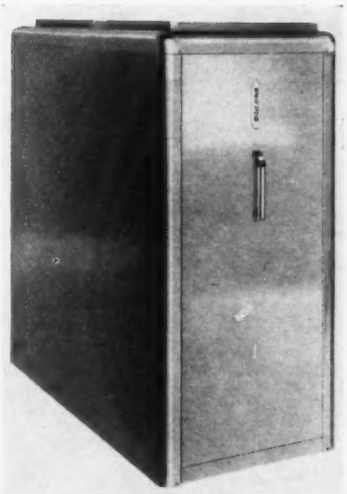
54—Package Blower-Filter

Viking Air Conditioning Corp., 9500 Richmond Avenue, S. E., Cleveland, announces a new small package unit that will convert a standard gravity furnace installation into a



modern forced air system at a negligible increase in cost. This unit, designated as the Model EP-01, cleans, filters and forces warm air from the furnace to every room.

The sturdy steel cabinet of Model EP-01 is finished in hammered silver which harmonizes with galvanized casings, ducts and fittings. It measures 24½ in. wide, 20 in. deep and 30 in. high. This blower has a capacity of 850 cfm for furnaces of 65,000 Btu output.



55—Minute Man Conditioner

Conco Corporation, Mendota, Illinois, announces the "Minute Man" oil-fired air conditioner — a low-cost, packaged unit for homes up to six rooms. Overall dimensions for the cabinet—of baked enamel green Hammerloid finish—are 25 x 45 x 51½ inches. Net weight is 515 lbs.

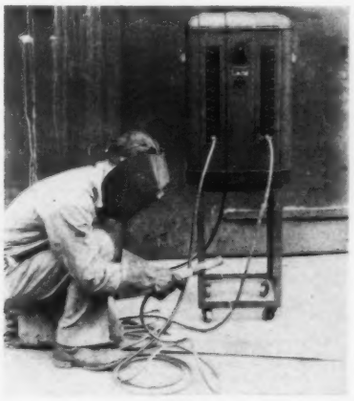
The new conditioner features the Magic Spray burner—providing a swirling, diffused flame. The blower is fully rubber insulated to circulate the rated amount of air without vibration or noise. The long hour heavy duty motor drives both burner and circulating blowers and oil pump.

Honeycomb-type filters — replaceable in the same frames—are used. An inclined pan type humidifier is provided. An externally mounted float reservoir with cover automatically maintains the proper water level.

◆

△56—Nu-Arc Welder

Nu-Arc Welder Sales Division of Electric Arc, Newark, N. J., offers the Nu-Arc A. C. arc welder, featuring low cost, smooth flowing, welding current. The unit is portable, works



with any electrode, handles light or heavy work, has a number of heat stages, double electrode welding, short or long lead, and works in any position. The unit is separate from the case.

Four models are available.

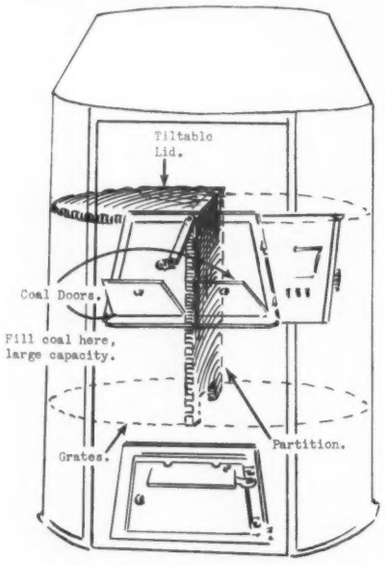
New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 102.

△57—DeWitt Device

Southern Illinois Coals, Inc., 307 North Michigan Avenue, Chicago, announces the DeWitt device for burning volatile coals without smoke.

The DeWitt device is a partition for the standard warm air furnace with a tiltable lid. In operation, the side of the fire box under the lid is filled with raw 3 x 2 high grade Illinois coal. As the fire in the open side

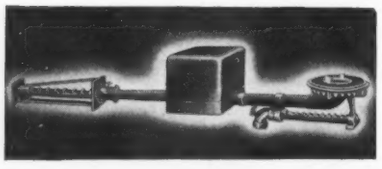


heats the house, it also cokes the raw coal. The smoke and volatiles coming from the closed side are forced to pass under the partition and up through the fire and are burned. When the fire gets low in the open side, the grates are shaken and the open side filled with coal and the lid turned. This covers the fresh supply of coal and exposes the fuel which is now coke with no smoke in it.

◆

58—Roto-Grate Bin-Feed

Standard Stoker Corporation, New Albany, Indiana, announces the Roto-Grate Bin-Feed stoker which automatically feeds the fuel from the bin, opens and closes the drafts, levels the



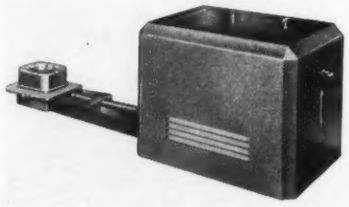
fuel bed, shakes the grates, dropping the ashes into an ash pit from where they are automatically conveyed to a handy container placed on the outside of the furnace. The Roto-Grate Bin-Feed Stoker burns bituminous fuel.

The Roto-Grate regular is a hopper model.

59—Clipper Stoker

Conco Corporation, Mendota, Illinois, is featuring their lowest cost stoker—the new Conco Clipper—for small and medium sized homes.

The new model follows the streamlined pattern of Conco's standard stoker units and like them is finished



in baked green Hammerloid enamel. The capacity of the closed type hopper is 225 pounds.

The "Flaming Forge" burner is heavy in construction.

A 1/5 hp. a. c. motor is provided —a continuous feed model with adjustment for three fuel rates.

◆

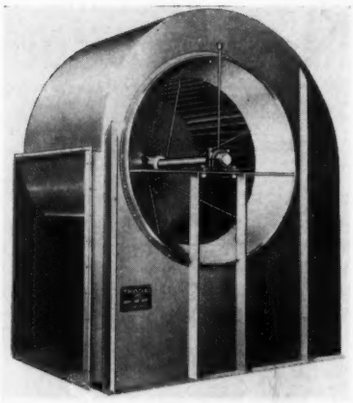
60—Multiple Spot Welder

The Eisler Engineering Co. of 740-770 So. 13th St., Newark, N. J., has recently placed the illustrated multiple spot welder on the market. The insets, lettered from A to H, show a few of the various multiple spot weld-

ing setups possible. Adjustments can be made to make circular, straight, square, rectangular or any odd shape welds. From 2 to 12 spots can be made simultaneously, depending on the nature of the job.

These machines are primarily intended for the spot welding of light sheet metal work where a large range of adjustments for various spots and shapes are to be considered.

Pressure electrodes are used with suitable air operation equipment. The electrodes have an individual adjustment so as to maintain an even pressure on all the spot welds being made.



•61 Fan Line

The Trane Company, LaCrosse, Wisconsin, presents an inclusive range of backward and forward curved blower fans for all heating, cooling and ventilating applications.

Trane Type FC fan wheels are of the forward curved, multi-blade type, and have been developed to conserve space, lessen power requirements, eliminate noise, and yet deliver full capacity at the lowest possible speed.

The BI wheels have twelve backwardly inclined blades with a special, accurately formed rim.

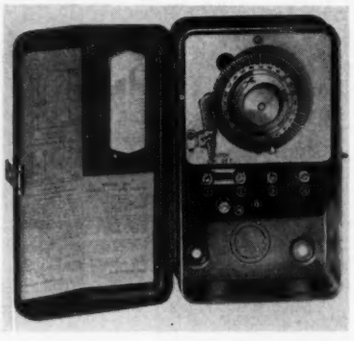
Included in the line are direct connected units for general utility duty, supply and exhaust. Both FC and BI fans are available in this construction, which consists of integral motor brackets, fan housing, single width wheel mounted directly on motor shaft. The housings are convertible for various standard directions of discharge. Capacities range from 295 to 4500 cfm.

Trane Type FC fans are available in single and double widths, in sizes ranging from 4½-in. wheel diameter to 60 in. Type BI fans range from 15 in. to 66 in.

◆

62—Time Switch

Paragon Electric Co., 37 W. Van Buren St., Chicago, offers the new Series 300 time switches. There are two exposed gears, all others operating in a sealed oil bath.



Operation is accomplished by slow speed (450 rpm) industrial type self-starting synchronous motor.

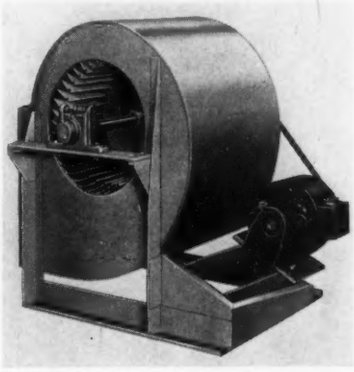
The case is compact and made of 18-ga. steel with a seamless drawn cover and base, streamlined.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 102.

△63—Quiet-Aire Blowers

Maple City Stamping Co., Peoria, Illinois, announces new models of the Quiet-Aire blower line. Ralph Folkerts, vice-president and treasurer in charge of production, says Quiet-Aire



covers a full range of sizes, delivering from 850 cu. ft. per minute to several thousands. Patented salf-aligning, self-lubricating bearings are standard equipment. Patented self-adjusting motor mounting maintains proper belt tension, and the 10-speed adjustable drive permits easy selection of fan speeds.

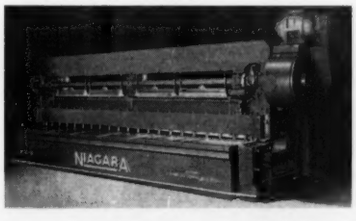
The Quiet-Aire is encased in an automobile steel cabinet of striking modern design.

◆

64—KL-18 Shear

Niagara Machine & Tool Works, Buffalo, N. Y., announces a new No. KL-18 power squaring shear having 18-foot cutting length and capacity of 3/16 inch.

The KL-18 shear offers advanced engineering design resulting in ac-



curate flat cutting and increased production. The shear is equipped with a quick setting, self-measuring, ball-bearing, parallel back gage adjustable to increments of 1/128 inch.

All drive gears are mounted on anti-friction bearings, and enclosed in oil-tight case. The shear is controlled by means of a 14 point clutch which operates in a bath of oil.

The illustration shows the shear equipped with fluorescent lights which illuminate the working surface of the bed, and throw a shadow line at the cutting edge for convenience in shearing to a straight edge.

Toggle operated, independent spring pressure foot hold down provides a smooth and firm grip on sheets of varying lengths.

◆

65—Roofloy

Revere Copper and Brass Incorporated, 230 Park Avenue, New York City, announces Roofloy, an improved type of roofing sheet lead for which the advantages of lighter weight, greater tensile strength, lower installation cost and reduced tendency to creep are claimed. 30 x 96 inch sheets weigh approximately forty pounds.

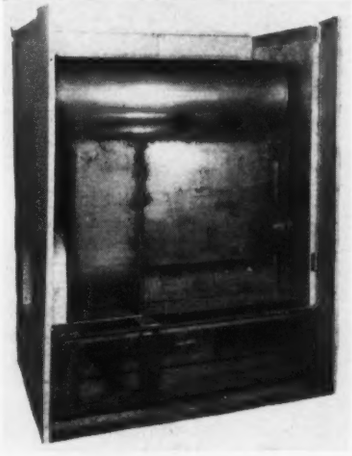
◆

△66—Conditioner with Tank

Wendell F. Austin of Medford, Mass., has been granted a patent which is the base on which several air conditioning units have been built, for home and year-around water heating.

The water tank lies horizontal, over the heating chamber section.

The heater draws its cold air through the cold air ducts, through the filters and then propels the air through the oven, in the top of which



rests a water tank. The warm air is forced down the other side of the oven and under an insulated partition, over the humidifying pan and up through the warm air ducts.

The temperature of the heating chamber, in which the water tank rests, is controlled thermostatically.

The house temperature is controlled by thermostat which controls only the blower. When the blower stops, downward warm air around the stove section tends to reverse itself and thereby trap warm air around the tank and stop air motion.

The unit can be used with any automatic heat—oil, gas or stoker. Cooling can be installed and used for cooling, even while the water is being heated.

67—Crescent Model R

Century Engineering Corporation, Cedar Rapids, Iowa, has perfected a new furnace unit which eliminates back pressure and combustion pulsation.

In the Century Crescent, the secondary and primary area is one integral unit, shaped to allow gases to travel in an unbroken stream, taking advantage of every available inch of heating surface.

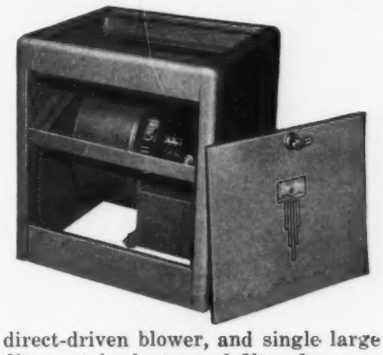
New designing of the Crescent has accomplished a zero draft reading by eliminating restrictive baffles. All sizes of the new unit employ 50 sq. ft. of prime heating surface for each gallon of fuel.

Another feature is the stainless steel fire box—light in weight, imperviousness to heat, and rapid heat absorption The workability factor of stainless permitted Century engineers to design a fire box which fits the shape and size of the oil flame. The fire box is cone shaped at exactly the nozzle spray angle. A secondary air intake at the ignition point makes possible combustion efficiency never before obtainable. The formation of carbon on the nozzle and ignition points is prevented by cooling secondary air passing over the manifold and ignition assembly.

◆

68—Airboy

Peerless Electric Company, Warren, Ohio, announces the Peerless Airboy —a package unit with 3-speed motor,



direct-driven blower, and single large filter set in dust-proof filter frame.

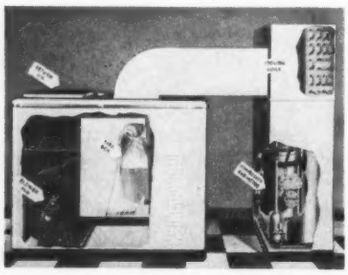
Two-speed automatic control and 3-speed manual control are both available at extra cost.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use coupon on page 102.

69—Combination Conditioner

Airtemp Division, Chrysler Corp., Leo St., Dayton, Ohio, is offering a new combination heating and cooling unit. The cooling unit being sold with winter air-conditioning furnaces is

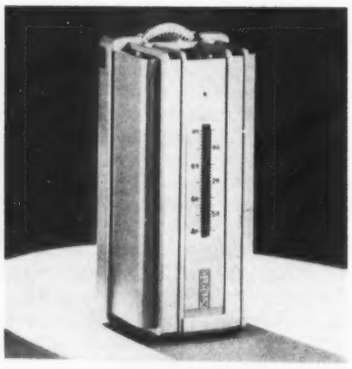


the same as those sold commercially with the exception that the built-in blower is eliminated and the cooling coils placed in a vertical position. The furnace blower is utilized in the summer to circulate the air through the cooling coils and a minimum of ductwork is required to connect the furnace with the cooling unit.

◆

70—Thermostat

The Perfex Corporation, 500 W. Oklahoma Place, Milwaukee, offers the No. 200-D14 heavy duty line voltage thermostat, designed specifically for the control of unit heaters.



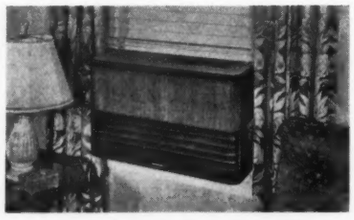
When used for heating, this device may be set to control at any desired temperature from 40 to 80 deg. F. For ventilating purposes, an "On" position beyond 80 deg. produces continuous fan operation.

Rugged construction, high sensitivity and fast response assure performance in maintaining close temperature control.

◆

•71—Air Conditioning Unit

The Air Conditioning Division, Westinghouse Electric and Manufacturing Company, East Springfield, Mass., announces a new plug-in air conditioning unit that cools, dehumid-



ifies, heats, ventilates and filters air, for use in home or office.

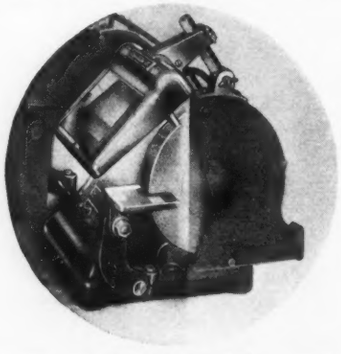
The unit is window-mounted with ½ horsepower condensing unit which has up to 6,000 Btu cooling effect and 9,200 Btu heating effect. It cools or heats, filters and circulates 200 cu. ft. of air per minute; brings in and cools or heats 60 cu. ft. of outside air per minute; and expells 75 cu. ft. of stale air per minute.

Both heating and cooling are done by the same refrigerating mechanism.

◆

•72—Flud-Lite Shields

Stanley Electric Tool Division, The Stanley Works, New Britain, Conn., offers a new "Flud-Lite" eye shield



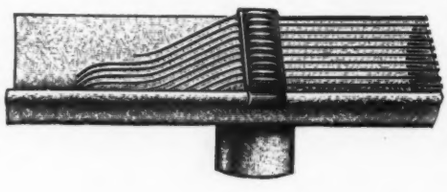
for use on all grinders, belt or motor drive. Two bayonet type light bulbs throw light directly on grinding wheel and work. The eye shield is adjustable up or down and can be arranged to suit the operator's position.

The No. 600 "Flud-Lite" comes complete with two light bulbs, bolts and instructions.

◆

73—Eaves Trough Shield

Right Way Shield Company, 955 Spitzer Building, Toledo, Ohio, offers a new eaves trough shield, for new or old trough. The Shield permits water to flow under the leaves, floating them up a streamline inclined shield and out over the top, or they are left stranded on the horizontal



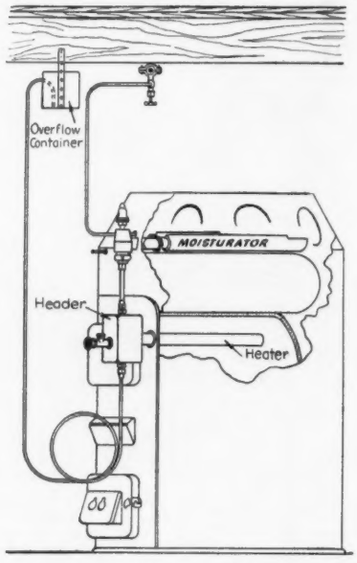
part of the shield up from the bottom of the trough.

Five models are available in three sizes each.

◆

△74—Moisturator

W. A. Russell & Company, Bridgeport, Conn., announces the Warco Moisturator, a fully automatic patented humidifier. A newly designed



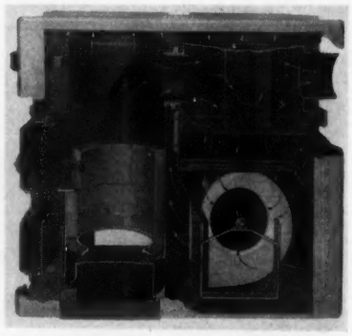
float valve with a positive control automatically furnishes necessary water for evaporation.

The Moisturator is installed in the bonnet of the furnace. A special heater is installed in the fire box of the furnace.

◆

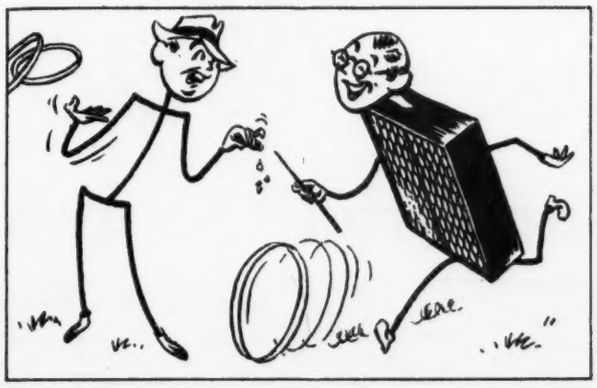
75—Stoker Conditioner

Round Oak Company, Dowagiac, Michigan, announces a new Round Oak SPX stoker furnace available in three sizes—Btu bonnet ratings of 118,000, 153,000 and 188,000 respectively. The package unit — furnace



with blower, automatic humidifier and filter—is enclosed in a blue Hammerloid casing.

The Round Oak SPX consists of a heavy, copper-bearing steel combustion chamber and large baffled heat exchanger, electricaly arc welded. It has patented Round Oak clinker chute and receptacle, convenient for removal of any clinker formation that develops in stoker operation. The unit is built with side extension for stoker on either left or right.

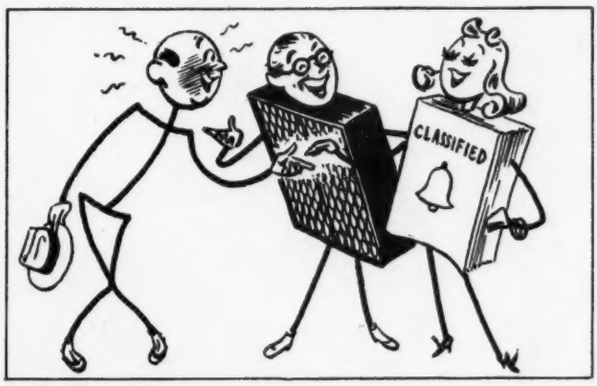


Heating Contractor: I don't care two hoops if Fiberglas* Dust-Stop* Air Filters *are* standard equipment on 85% of all forced warm-air heating and air-conditioning equipment!

Dust-Stop Man: You're missing a money maker!

H. C.: *What?* Make money on Dust-Stops? G'wan!

D. S.: There's a whale of profit in 'em . . . and they sell *fast!* When replacement time comes around, Dust-Stops have the biggest promotion program you ever saw on filters!



H. C.: The *biggest?*

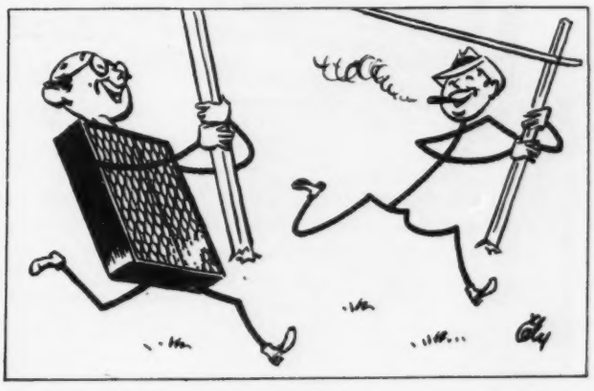
D. S.: Yes, Sir! And Dust-Stops have the industry's *most complete* set of free dealer helps on filters. You can even get your own listing under the Dust-Stop telephone directory heading!

H. C.: Hmm! How much stock must I carry?

D. S.: Practically none! Dust-Stops, guaranteed by the makers of Fiberglas, are delivered to you with lightning-like speed *all the time!*

H. C.: Hey! This sounds like the nuts of an idea!

D. S.: *It is!* And Dust-Stops are one of the most fire-safe of all replacement filters! Their pure glass fibers and adhesive *will not* support combustion!



D. S.: What's more, Dust-Stops have a price and discount policy that's a winner. Everybody profits.

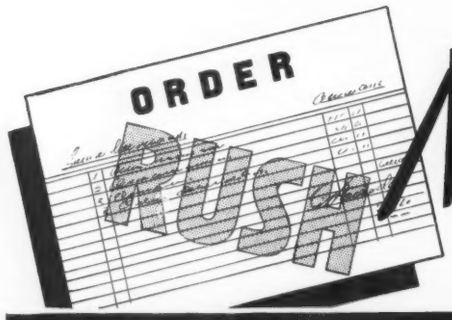
H. C.: Wow! You've knocked me for a row of goal posts. With the Dust-Stop program I can get scores of new filter replacement customers. Thanks for tipping me off!

FIBERGLAS* DUSTOP* AIR FILTERS

*T.M. Reg. U. S. Pat. Off.

Made by Owens-Corning Fiberglas Corporation, Toledo, Ohio

DIRECT CANADIAN INQUIRIES TO FIBERGLAS CANADA, LIMITED, OSHAWA, ONTARIO



No Time Now for "Doubtful" Screws

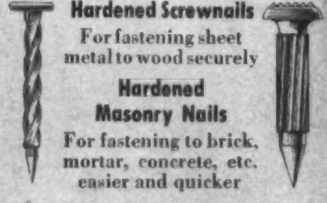
ASSEMBLY
DEPT.
Guarantee
OF HIGHEST QUALITY
To assure satisfactory performance, Parker-Kalon Fastening Devices are made to exacting specifications covering dimensional and physical characteristics which are checked at every stage of manufacture, and passed upon by Parker-Kalon's Quality-Control Laboratory. Should this product prove faulty in any way, replacement will be made without charge.
PARKER-KALON CORPORATION
NEW YORK, N. Y., U. S. A.

AVOID SCREWS THAT MAY EAT UP TIME — BOOST COSTS . . . SPECIFY PARKER-KALON QUALITY-CONTROLLED FASTENING DEVICES

COSTS NO MORE *to get this Parker-Kalon Quality-Control Guarantee with every box of . . . .*

Hardened Self-tapping Sheet Metal Screws

Sizes and head styles for assembling light and heavy sheet metal



Hardened Screwnails

For fastening sheet metal to wood securely

Hardened Masonry Nails

For fastening to brick, mortar, concrete, etc. easier and quicker

Now, as never before, it is important to guard against "doubtful" screws. For they can knock assembly schedules haywire! Sure, such screws may *look* all right. Most of them will even *work* all right. But it takes only a small percentage that won't go in quickly, that won't draw up tight, that strip their threads or break, to eat up a whale of a lot of time and increase costs.

So . . . protect yourself against these speed-killing "doubtful" screws! Specify Parker-Kalon Fastening Devices! There's an unequalled GUARANTEE OF QUALITY-CONTROL in every box . . . a GUARANTEE that every Parker-Kalon Screw will go in fast and easily, and hold tight. This GUARANTEE is backed by the industry's greatest Quality-Control Laboratory . . . by Parker-Kalon's unique inspection routine which assures unvarying uniformity of mechanical and metallurgical characteristics.

Be sure of getting Fastening Devices that will "hold up their end" of assembly schedules. Specify PARKER-KALON! Parker-Kalon Corp., 190-192 Varick Street, New York, N. Y.

SOLD ONLY THROUGH RECOGNIZED DISTRIBUTORS

Quality-Controlled **PARKER-KALON Fastening Devices**

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on page 102.

142—Oil Burner Motors

The Emerison Electric Manufacturing Company, 1843 Washington Ave., St. Louis, is distributing a 4-page sales sheet on motors especially engineered for oil burner applications with dimensional data.

◆

143—Heating Equipment

Automatic Burner Corporation, 1823 Carroll Avenue, Chicago, is distributing an 8-page and cover red, white and blue booklet entitled "America's Heating Equipment" illustrating and describing the entire line of ABC heating devices—pressure burners, rotary burners, matched water heater units, and matched furnace burner units.

◆

144—Your Best Air Defense!—for Theatres

United States Air Conditioning Corporation, Northwestern Terminal, Minneapolis, offers a 24-page catalog entitled "Your Best Air Defense!"—Refrigerated Kooleraire for theatre owners and engineers. The unit contains a refrigeration compressor unit; an air cooling, dehumidifying and circulating unit; and an evaporative condenser.

Layouts of typical theatre installations are shown, followed by general specifications and capacities.

◆

145—Roofloy—Lead Roofing

Revere Copper and Brass Incorporated, 230 Park Avenue, New York City, is distributing a 20-page booklet covering their Roofloy lead roofing—lead sheets strengthened by the addition of calcium, magnesium and tin. New properties and thinner sheets offer new economy to lead roofing material. Advantages include high creep resistance, light weight, non-staining qualities, acid resistance, attractive color, relief and ornament, and availability.

Technical information, construction, seam details, ornamentation and six pages of roofing specifications make up the text.

◆

146—Welded Steel Tubing Handbook

Formed Steel Tube Institute, 1621 Euclid Ave., Cleveland, has revised and is offering their "Handbook of Welded Steel Tubing" in a durable looseleaf binding, pocket size—86 pages. Price $1.00.

Welded tubing is formed from flat rolled strip. The booklet contains full information for designing engineers regarding standard sizes and properties of welded tubing. Standard sizes, together with commercial tolerances for roundness, wall thickness, straightness, etc., are tabulated for various grades of welded tubes. The manufacturing and fabricating processes are illustrated and dimensioned drawings show on typical examples to what degree welded tubing can be cold worked in such operations as bending, beading, flanging, expanding, tapering, etc. Special attention is given to recommendations for laying out fabricated parts and methods of checking. There is a list of articles for which welded steel tubing is used.

◆

Consumer Literature

Maintained Comfort with Temperate-Air—Temperate-Air Furnace Co., Albertville, Ala., offers a 4-page folder with space for dealer imprint. The Temperate-Air is an automatic coal burning winter air conditioning unit for business and residential heating, and is always sold as a unit including the proper stoker matched with the furnace for correct operation. **Coupon No. 147**

◆

Smartest Investment We Ever Made—Freeman Stoker Division, Illinois Iron & Bolt Co., 918 S. Michigan Ave., Chicago, is distributing a 12-page booklet with space for dealer imprint. Text and pictures tell what a Freeman stoker will mean in the home, savings in fuel, and the various models are shown. **Coupon No. 148**

No "doubtful screws" in his shop...he insists on *genuine* Parker-Kalon Screws!

JOIN the vast army of sheet metal contractors who turn out good jobs faster and keep profits from slipping away by avoiding "doubtful screws"—screws that *look* right but some of which don't *work* right... heads breaking off, threads stripping, screws failing to draw up tight.

Order Parker-Kalon Screws and be sure of stronger, quicker fastenings *every time.* For these Screws are produced by the originators of the Sheet Metal Screw, backed by over 25 years' screw-making experience, and Quality-Controlled through every step of manufacture by the famed Parker-Kalon Laboratory. Remember, imitations give imitation results... so insist on Parker-Kalon! Send for free samples. Parker-Kalon Corporation, 190-192 Varick Street, New York, N.Y.

Quality-Controlled

TYPES, SIZES, HEAD-STYLES FOR EVERY SHEET METAL ASSEMBLY

SOLD ONLY THROUGH RECOGNIZED DISTRIBUTORS

PARKER-KALON
Sheet Metal Screws

New Literature . . . .

For your convenience in obtaining copies of new Literature use the coupon on this page.

149—Air Conditioning Registers and Grilles

The Independent Register Co., 3747 East 93rd St., Cleveland, is distributing Catalog No. 41 AC—January, 1941—covering air conditioning registers and grilles.

◆

150—Reznor Closet Furnace

Reznor Manufacturing Co., 140 James St., Mercer, Pa., is distributing a 2-page loose-leaf Bulletin K060 covering the new Reznor gas furnace designed for the low-cost FHA house.

◆

151—Humidifiers—Form 701

Maid-O'-Mist, Inc., 215 N. Aberdeen St., Chicago, is distributing a price sheet showing their various types of humidifiers with sizes, capacities and prices—Form 701.

◆

152—Fan Price Sheets

Hunter Fan and Ventilating Company, Inc., Sterick Building, Memphis, Tenn., is distributing price sheets with illustrations and specifications covering their exhaust fans, attic fans and housed circulators.

◆

153—Furnace Pipe and Fittings

Sheet Metal Specialty Company, Third & Liberty Avenue, Pittsburgh, offers a new catalog showing the complete line of Follansbee Forge stove pipe, furnace pipe and fittings. Gauges, sizes and shipping weights are listed and alternative methods of closing and locking the pipe are illustrated.

◆

154—Oil Burner Installation Wiring Diagrams

The Mercoid Corporation, 4201 Belmont Avenue, Chicago, is distributing a booklet illustrating hook-ups for Mercoid automatic controls in conjunction with oil burner installations on different types of heating systems.

Included is the regular hook-up for gravity circulation, gravity circulation with fully automatic day and night thermostatic control, forced circulation hook-up and forced circulation (zone controlled).

◆

155—How to Sell Heating Appliances

Cook Electric Company, 2700 Southport Avenue, Chicago, offers "How to Sell Heating Appliances" by James V. Malone—a retail sales manual and customer data book prepared for retail heating dealers and distributors of heat regulating devices.

The text calls attention to the fuel and labor wasted each year for lack of automatic controls now on the market. Picking prospects is discussed and how to follow through to make the sale. Mechanical and operating details of Cook controls are included as well as directions for installation, with a supply of customer information sheets.

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave.
Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

45	46	47	48	49	50	51
52	53	54	55	56	57	58
59	60	61	62	63	64	65
66	67	68	69	70	71	72
73	74	75				
142	143	144	145	146	147	148
149	150	151	152	153	154	155

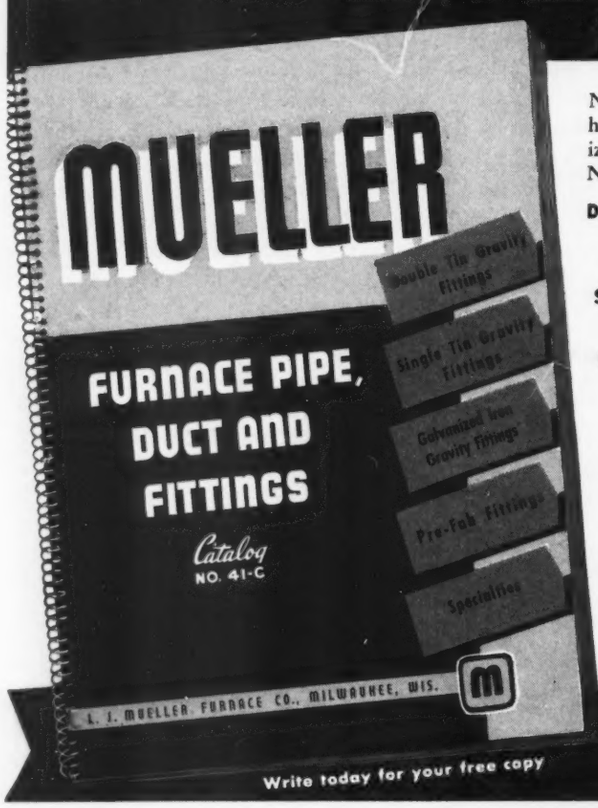
Name .....

Company .....

Address .....

Are you Manufacturer——Jobber——Dealer——

New 64-page fittings book saves your *time and money*



Write today for your free copy

New convenience, all in one big, handy book . . . tin and galvanized gravity and forced air fittings. New products — such as the knocked-down cold air shoe, easily and quickly assembled as either a 90° or a 45° shoe by simply interchanging some of the panels.

Double Tin Gravity Fittings — including new streamlined Mueller designs, to cut down air resistance and provide time-saving short-cuts for the installer.

Single Tin Gravity Fittings — with similar design improvements. These "made-up" fittings permit quicker assembly on the job.

New Line of Galvanized Iron Gravity Fittings — formerly made to meet specific building code requirements, now offered to all. Many items interchangeable with Mueller "Pre-Fab" forced air fittings, to cut down your investment in stock.

Pre-Fab Fittings — the well-known line . . . for easy, satisfactory forced-air duct systems that save you time, money, and headaches . . . including Mueller patented Take-off Fittings.

Specialties — including Mueller Air Moisteners, the Mueller Boost-Aire, etc. . . . Everything you need, now under one cover . . . available from one convenient, dependable source. Ask your jobber or write L. J. Mueller Furnace Co., 2010 West Oklahoma Avenue, Milwaukee, Wisconsin.

D-15

MUELLER Milwaukee

GRAVITY AND FORCED AIR FURNACE PIPE AND FITTINGS

For Dependable Performance at LOWEST COST

Specify U.S. AIRCO.

COOLING
HEATING
VENTILATING
and
AIR CONDITIONING
EQUIPMENT

If you are looking for soundly engineered and manufactured equipment that does the job economically, makes a profit for the man who installs it, and assures dependable low-cost performance for the user, you'll find USAIRCO is the kind of organization you'll like to work with.

With a background of 17 years of successful service and the knowledge and experience gained from thousands of installations, USAIRCO's cooperative engineering service can be a valuable ally in your business. Why not drop us a line?

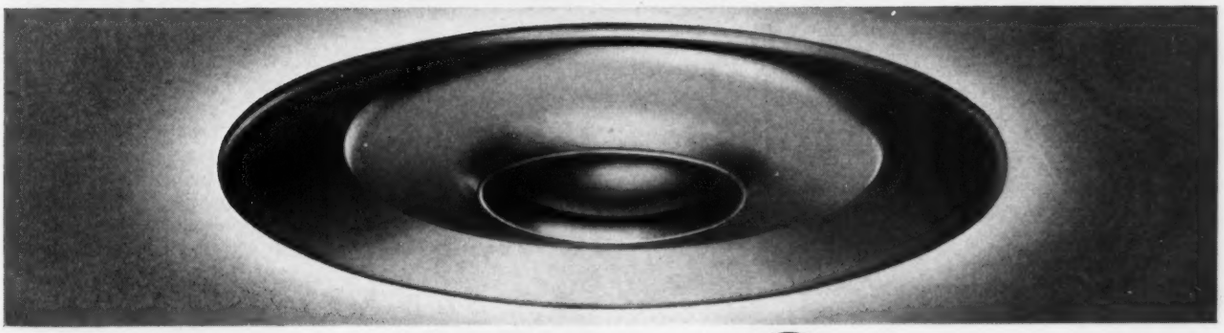
USAIRCO *Equipment Includes*

BLOWERS • AIR WASHERS • CORES • UNIT HEATERS AND COOLERS • FILTERS • GRILLES • HUMIDIFIERS AND DEHUMIDIFIERS • PACKAGE SYSTEMS IN EVAPORATIVE, COLD WATER AND REFRIGERATION TYPES • PORTABLE AND WINDOW ROOM COOLING UNITS

UNITED STATES AIR CONDITIONING CORPORATION
NORTHWESTERN TERMINAL * * * MINNEAPOLIS, MINNESOTA

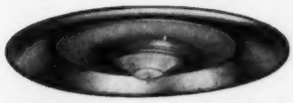
USAIRCO Air Conditioning Equipment

SCIENTIFICALLY *Proved* PERFORMANCE



FLUSH TYPE

venturi-flo CEILING OUTLETS



SURFACE TYPE

Two principal designs of VENTURI-FLO units are available — Flush or Surface types, as shown. The choice is a matter of appearance only, as both give similar performance.

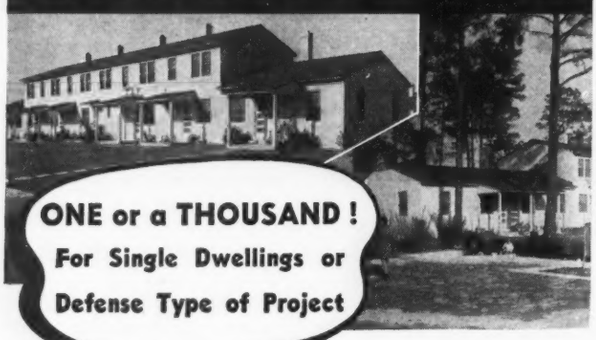
In numerous tests, under both service and laboratory conditions, the superiority of VENTURI-FLO Draftless Air Distribution has been conclusively shown. Greater aspiration capacity provides more thorough diffusion and room-wide uniform temperature.

venturi-flo-lite

Where a combination lighting fixture and air distribution outlet is desired, specify one of several models of VENTURI-FLO-LITE for greatest beauty and efficiency.

1226 ROCK ST. BARBER-COLMAN COMPANY ROCKFORD, ILL.

Low-Cost VIKING
Oil-Burning FURNACES
WATER HEATERS—SPACE HEATERS



ONE or a THOUSAND!
For Single Dwellings or Defense Type of Project

6114 VIKING UNITS recently installed in Large Projects at

Jacksonville, Fla.
Lakeland, Fla.
Savannah, Ga.
Augusta, Ga.
Columbia, S. C.
Charleston, S. C.
Norfolk, Va.
Newport News, Va.
Portsmouth, Va.
Jarrett, Va.
Baltimore, Md.
Raleigh, N. C.
Greensboro, N. C.
Rochester, N. Y.
Minneapolis, Minn.

Whether you deal with individual owners or large project operators, look to Viking for Oil-Fired equipment. Viking meets the strictest specifications, private or government — *delivers promptly on schedule*— quotes prices which get the order.

Viking heaters burn fuel oil, operate automatically and satisfy the user. Ample hot water for an average family for $1.50 monthly. A full range of sizes, 20 to 45 gallons — recovery rates, 20 to 50 gallons hourly.

Viking model 55 Furnace with 625 C.F.M. blower costs but little more than a stove. Doing a good job of heating from Minneapolis to Miami. Delivered as a package ready to install; attractive silver gray Hammerloy finish, Detroit Lubricator and White-Rodgers Controls; Emerson Motor and Fan.

VIKING FEATURES

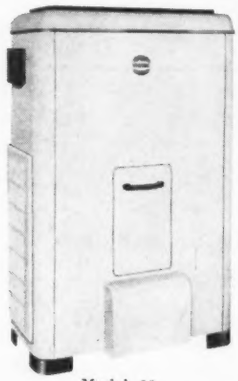
Model 830-S 30 Gallon storage, 30 Gallons per hour recovery.

Water Heaters

Burn Fuel Oil, automatic without use of electricity . . . Breese Vaporizing Burner, Automatic Products Thermostat, 2 oil valves, 300 pound test, galvanized tank . . . white baked enamel finish with black trim . . . Underwriters' Label and our warranty with each unit.

Winter Air Conditioners

Several Models— 55,000 to 100,000 BTU capacity — 625 to 1100 C.F.M. all ratings at bonnet . . . all controls, filters, combustion chamber door, etc., readily accessible from front of unit . . . Breese vaporizing burners, natural or forced draft . . . Underwriters' label and own warranty with every unit. Field Engineering service available.



Model 55 Manual or Automatic for Basement or Utility Room.

Write for catalogs and prices

VIKING MFG. CORPORATION
Box 43, Strathmoor Station, Detroit, Michigan

With the Manufacturers . . .

Freeman Stoker Sales Convention

Illinois Iron & Bolt Company, 918 S. Michigan Avenue, Chicago, held a two-day 1941 national sales convention at the Morrison Hotel recently, supplemented by a similar meeting in Nashville, Tennessee, for wholesalers.

H. C. McNeil, president, complimented the group on their 71 percent sales increase for 1940 over the preceding year. J. M. McClintock, manager of the Freeman Stoker Division, set quotas for 1941 fifty percent ahead of 1940 and announced a national advertising program in leading magazines to support sales activities.

◆

Celebrates Silver Anniversary

This year marks a quarter of a century of ventilating progress for the Autovent Fan and Blower Company, of Chicago. The company was organized early in 1916 and they have continually improved and expanded their line of fans, blowers and unit heaters. Today, every piece of equipment carries certified ratings in accordance with their several recognized association memberships. The company is a member of the National Association of Fan Manufacturers, the Propellor Fan Manufacturers Association and the Industrial Unit Heater Association.

◆

Fluid Heat Air-Conditioning School

The Fluid Heat Division, Anchor Post Fence Co., Baltimore, held a two-day air-conditioning school on March 17 and 18 at which technical and sales problems were discussed.

The first day of the school was devoted to air distribution, duct sizes, register location, selection of unit, and other technical problems, with T. H. Smoot, chief engineer, as the principal instructor. The text book used was

the new copyrighted publication written by Mr. Smoot and W. S. Howland of the organization. By means of a simplified approach and carefully prepared charts, the book takes much of the mystery out of air-conditioning. Dealers used it to figure actual jobs during the session.

In the forenoon of the second day, sales problems were covered by Frank P. Harbin, sales manager. The afternoon was devoted to a trip through the factory where manufacturing processes were explained.

Of the organization, Wm. F. Brannan, president, T. H. Smoot, Frank P. Harbin, M. J. Donahue, John S. Case, W. S. Howland, Charles N. Lockwood, D. G. Day, Frank J. Spath and Don Woodin were in attendance.

With the Manufacturers . .

Galvanizers Committee to Meet

The annual spring meeting of The Galvanizers Committee will meet May 1 and 2 at the Hotel William Penn, Pittsburgh.

Membership in this committee, which is sponsored by the American Zinc Institute, is limited to the manufacturing companies engaged in galvanized sheet production, and technical and operating representatives from the galvanizing departments of these companies are privileged to attend meetings.

D. A. Russell of Youngstown Sheet & Tube Co., is chairman of the Program Committee.

The Committee's governing board consists of—

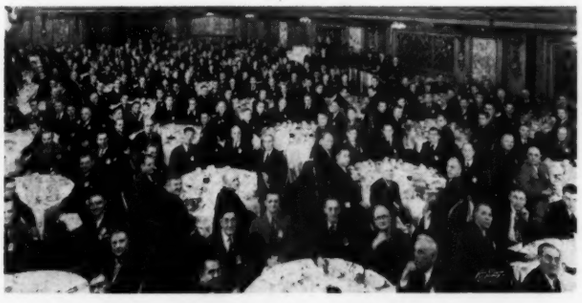
Nelson E Cook, Chairman—Wheeling Steel Corporation
R. H. Dibble—Carnegie-Illinois Steel Corporation
C. K. Lytle—Tennessee Coal, Iron & Railroad Co.
W. R. Shimer—Bethehem Steel Company
J. J. Shuman—Jones & Laughlin Steel Corporation
C. H. Steele—Steel Company of Canada, Ltd.
F. G. White—Granite City Steel Company

◆

Seventh Annual Stoker Convention

About 600 dealers and distributors attended the seventh annual stoker convention of Fairbanks-Morse & Co., on March 17 and 18 at the Congress Hotel, Chicago.

Talks were made on the first day by H. L. Bilsborough, manager of the Stoker Division, and Henry J. Barbour, sales promotion manager of the company, who talked on "An All-Out Offensive for Increased Sales."



On Tuesday, the convention was marked by a very interesting ad building skit, wherein H. L. Bilsborough, Harry Baum and Arthur L. Decker of Henri, Hurst & McDonald, the company's agency, donned carpenter's aprons and wielded hammers and saws to carry out the construction job of building a large advertisement, piece by piece. As the skit went along, it explained the "whys" and "wherefors" of each section of the ad. Human interest was further manifested by showing the seven one-half page advertisements which the company is to carry in Life Magazine as the spearhead of the campaign. Besides Life, a fall campaign will be carried on in Better Homes & Gardens with quarter pages appearing in September, October and November.

Arthur C. Dodge, vice president and general sales manager, gave the welcome address.

◆

Quiet Heet Advertising Campaign

Quiet Heet Mfg. Corp., 135 New Jersey R. R. Ave., Newark, N. J.—Samuel L. La Pidus, president—announces that plans have been completed to inaugurate a spring and summer advertising campaign for Quiet Heet oil burners in national magazines with a combined circulation of over 9,000,000. The opening advertisement is scheduled in April in the Saturday Evening Post, Life and Collier's. Copy is designed to "dig up" prospects.

This is the first Quiet Heet consumer advertising directed at homeowners and all leads and inquiries will be turned over to local dealers for "follow-up."

A Profitable source of
OIL CONTROL KNOWLEDGE
to fit your
CONTROL PROBLEMS!

Hundreds of Low Cost Homes are now successfully heated with popular-priced Gravity Oil Burning Furnaces—assured of fuel economy and trouble-free fuel control by A-P DEPENDABLE Furnace Control Sets.

Look for the A-P Control on YOUR Furnace Line. It's "Performance Insurance" that means customer satisfaction . . . Assurance that you get every last bit of heating efficiency OUT of the furnace that the Manufacturer built INTO it. That's why the A-P Trademark is a valuable advantage to you in Furnace selling.

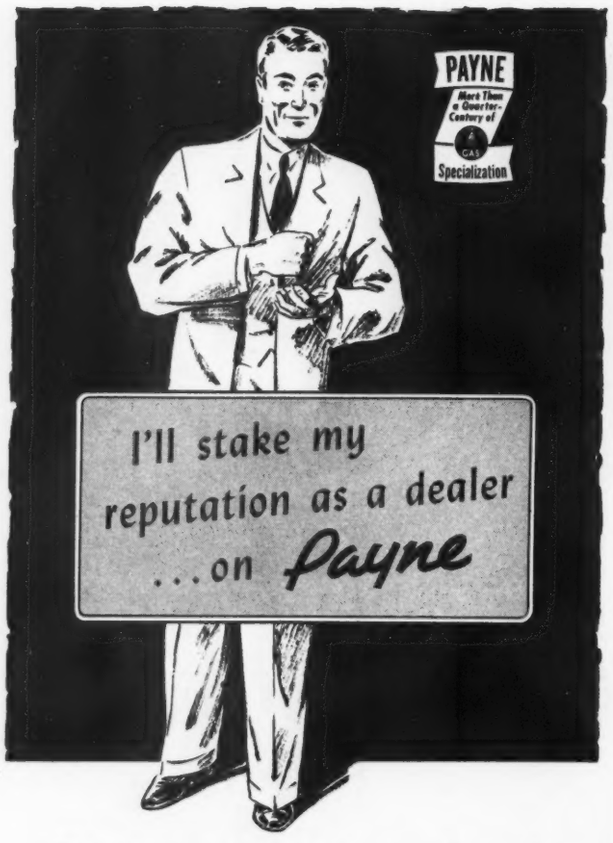
*Manufacturers! Write for information on A-P Fuel Controls for Oil Burning Furnaces, Heaters and Ranges. A-P Engineering knowledge will solve your problems.

Typical Oil Controls

A-P Thermostatic Furnace Control—Relay type

A-P Thermostatic Furnace Control Set—Heat Motor Type. Also made with Forced Draft or Circulating Fan Switch.

AUTOMATIC PRODUCTS COMPANY
2452 NORTH THIRTY — SECOND STREET
MILWAUKEE WISCONSIN

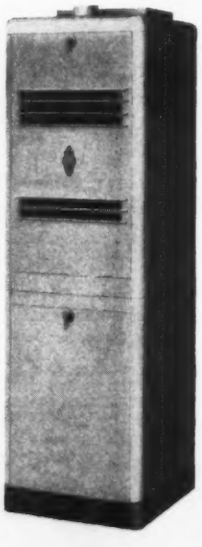


This statement truly reflects the attitude of PAYNEHEAT Dealers, from California to Maine, from Canada to the Gulf.

PAYNE places a value beyond price upon this intangible asset of good will – including the high esteem of gas utility men, Coast to Coast.

It is an asset that dollars cannot buy or measure. It can only be *earned* through year after year after year of *keeping faith* – in quality and fair dealing.

Recommend and sell the gas furnaces and heating units that have won national acclaim for engineering leadership, modern design, high efficiency, and owner satisfaction. A few territories are open for PAYNE representation. Address: J. H. Keber, Sales Mgr.



PAYNE FORCED AIR UNIT
One of 69 models and sizes for every modern heating need. All *double-tested*—by the AGA, and by PAYNE'S own Laboratory with the Industry's highest standards.

PAYNEHEAT
Payne FURNACE & SUPPLY CO., INC.
BEVERLY HILLS • CALIFORNIA

INDEPENDENT "Fabrikated" REG. U.S. PAT. OFF.

Adjustable
DIRECTED AIR FLOW
REGISTERS and GRILLES

LEAD in Adjustability

An unlimited range of deflections is made possible by the ability to adjust the grille bars INDIVIDUALLY. Air flows can be directed up or down, or right or left. The directional adjustment can be made at the time of installing; and after the system is operating, corrections can be made at any time to meet unforeseen or changed conditions.

TWO NEW CATALOGS READY FOR YOU

Independent's two new catalogs just off the press are most complete, with interesting data on registers and grilles for air conditioning installations, and registers and cold air faces for gravity installations. Most conveniently arranged, everything easy to find. Send for your free copies.

THE INDEPENDENT REGISTER CO.
3747 E. 93rd ST., CLEVELAND, OHIO

EVERY Grille Bar Can Be INDIVIDUALLY Adjusted

With the Manufacturers . .

Oil Burner Show

Forty-eight oil burner manufacturers and forty-nine oil burner accessory manufacturers exhibited at the National Oil Burner Progress Exhibition at Convention Hall in Philadelphia, March 17-22. During the same days the Oil Burner Institute held manufacturer and dealer meetings at the Benjamin Franklin Hotel.

On Wednesday, March 19, the engineering session of the convention was held. Speakers were C. R. Welborn, secretary of Underwriters' Laboratories, R. K. Thulman, mechanical engineer of Federal Housing Administration, R. S. Dill, mechanical engineer of National Bureau of Standards, and W. O. Lum, consulting engineer, Air Conditioning & Commercial Refrigeration Department, General Electric Co.

March 20 was "Dealer Day" with merchandising the subject of discussion. The same night the eighteenth annual banquet-dance was held. Chairman of this affair was Alexis Doster, vice president, Torrington Mfg. Co.

◆

Conco Entertains Distributors

Conco Corporation, Mendota, Illinois, held their 1941 convention at the Kaskaskia Hotel in LaSalle, Illinois, March 6, 7 and 8, with heating and conditioning equipment distributors from 25 different states and Canada.

The convention was called to present Conco's 1941 line

of coal, oil and gas-fired heating and conditioning equipment, as well as new price structures, new sales material and new sales strategy for the coming season.

Efforts this year will be directed at the new small home market. The company manufactures stokers and coal, oil and gas conditioners.

Distributors visited the plant at Mendota on the second day of the convention.

Awards were made at the banquet for greatest volume of sales—T. Vaughan Heath of Heath Guaranteed Heat, Inc., St. Louis—and for percentage of gain against quota —Brandes Heating Co., Madison, Wisconsin.

◆

Fiberglas Buys Rhode Island Plant

Owens-Corning Fiberglas Corporation, Nicholas Building, Toledo—Harold Boeschenstein, president—announces the purchase of the Lonsdale Company mill at Ashton, R. I., to expand production of Fiberglas. The Ashton plant is in the Providence industrial area, and has approximately 196,000 square feet of floor space.

Dust-Stop filters and glass wool for building installation are among their products.

◆

Cecil Swan

Cecil Swan, vice president in charge of sales at the Detroit Lubricator Company, died Sunday, March 23, at the Whittier, following a brief illness. He was born in Elmira in 1881 and lived in Detroit for the past 15 years. Burial at Elmira, N. Y.

Previously Mr. Swan was associated with the American Radiator and Standard Sanitary Corporation. He was a World War veteran and a member of the Recess Club.

Anyone can sell a "low-price" . . . it takes a *real* salesman to sell quality at a slightly higher price! But, oh, the satisfaction of hearing from pleased customers who buy on the basis of true value—and get their money's worth! If you have red blood in your veins . . . if you enjoy the challenge and fruits of a good sales battle . . . here's the stoker worthy of your talents! Pioneer of practically every important development in stoker design and construction, bearing a reputation for performance second to none, and now ready for 1941 with a wealth of *exclusive* features—Econ-O-Col offers you the opportunity of a lifetime to develop a solid, profitable stoker business WITHOUT money-wasting service calls!

BACKED BY A COMPLETE PROGRAM OF HARD-HITTING *Selling Helps*

WRITE TODAY FOR PRICES AND DETAILS ON MONEY-MAKING 1941 ECON-O-COL DEALER FRANCHISE

ECON-O-COL Automatic COAL BURNER

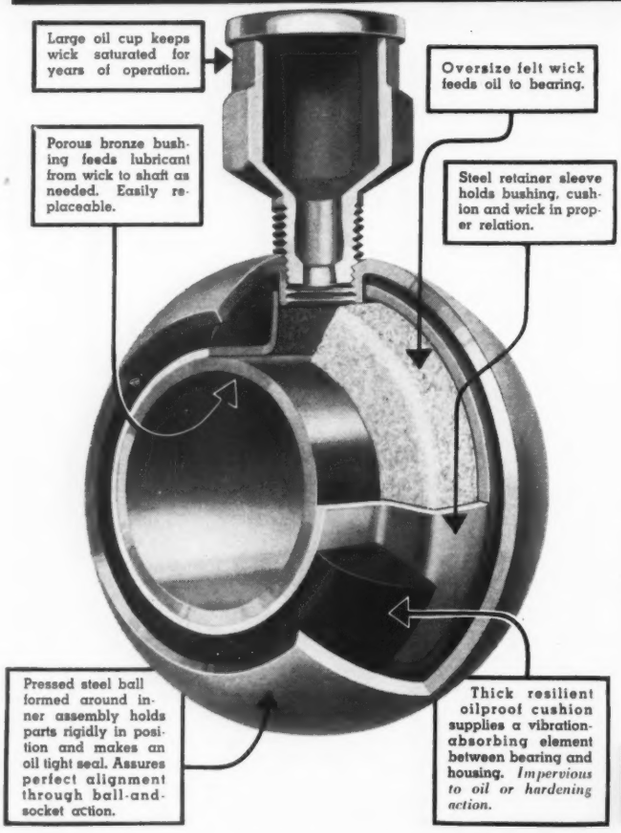
THE SHIELD OF QUALITY

ECON-O-COL

The "Stronghearted" Stoker

MANUFACTURED BY COTTA TRANSMISSION CORPORATION, ROCKFORD, ILLINOIS

No Other Bearing In Air Conditioning


Large oil cup keeps wick saturated for years of operation.
Oversize felt wick feeds oil to bearing.
Porous bronze bushing feeds lubricant from wick to shaft as needed. Easily replaceable.
Steel retainer sleeve holds bushing, cushion and wick in proper relation.
Pressed steel ball formed around inner assembly holds parts rigidly in position and makes an oil tight seal. Assures perfect alignment through ball-and-socket action.
Thick resilient oilproof cushion supplies a vibration-absorbing element between bearing and housing. *Impervious to oil or hardening action.*

has all these
QUALITY FEATURES

The Triangle Shock-Absorbing Pillow Block is a trouble-free bearing for fans, blowers and other devices requiring silent operation—perfect alignment —and self-lubrication.

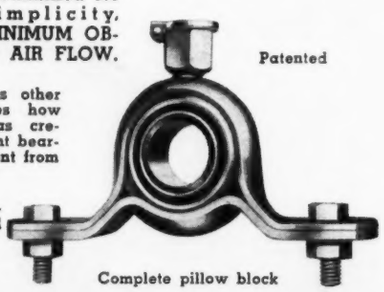
1. **It is the only bearing for air conditioning that has a resilient oil-proof cushion scientifically built into the bearing—for silence and vibration absorption.**
2. **Ball-and-socket design for perfect alignment.**
3. **Scientifically streamlined for compactness, simplicity, strength and MINIMUM OBSTRUCTION TO AIR FLOW.**

Patented

Cut-away view shows other features and illustrates how unique engineering has created a new type of silent bearing outstandingly different from the conventional.

Triangle design assures high efficiency and low cost operation.

Write for quotations.



Complete pillow block

TRIANGLE MANUFACTURING CO.
392 DIVISION STREET OSHKOSH, WISCONSIN

For Alert Dealers—
Bigger Profits
Faster Sales
Customer Satisfaction
—AUTOCRAT Oil Heat

Thrifty Convenient Healthful
AUTOCRAT
Balanced Flame OIL HEAT

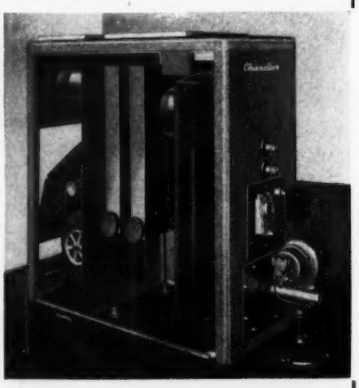
Complete with Autocrat Balanced Flame pressure burner. One-piece chassis. Extra large heating surface. Automatic humidifier. Quiet 4-speed blower. Filters. Preheating Economizer.

IT'S new . . . the Chandler "90" Oil Fired Winter Air Conditioner . . . the high-efficiency, low priced unit you need to boost sales. You can sell the "90" at a surprisingly low price and still make a good profit.

Specially built, engineered and styled for your biggest market—the 5 or 6 room home. 90,000 B.T.U. capacity (at the register) makes the "90" eligible for *three out of four jobs!* Sell it . . . install it and you can guarantee its performance.

The new Chandler "90" is compact—easy to install—easily serviced. Packed with advanced features that mean better heating, lower fuel costs, longer service and highly pleased customers.

Sell winter health-protection—greater comfort—modern furnace beauty. Cash-in with the money-saving Chandler "90". Write or wire today for Free Catalog A.



CHANDLER COMPANY CEDAR RAPIDS, IOWA

With the Manufacturers . .

Willis Changes Form of Name

The Willis Manufacturing Company has served the sheet metal and building trade throughout the Midwest for over 50 years. They manufacture Underwriters Labeled steel windows and Underwriters Labeled Tin-clad Firedoors, together with a complete line of sheet metal skylight and gravity ventilators at Galesburg, Illinois.

Effective April 25, 1941, they will operate under the name of, WILLIS STEEL CORPORATION with no change in address or personnel. D. T. Earnest is general manager.

◆

A. G. Brauer Meeting in St. Louis

More than 250 warm air heating contractors from St. Louis and the surrounding area attended the open house of the A. G. Brauer Supply Company, March 20, in the new home of the company at 2100 Washington Avenue. Contractors were escorted through the building and given every opportunity to inspect the very elaborate displays of products handled by the Brauer Company as well as the large stocks of merchandise now in place in the new building. At the conclusion of the evening program, refreshments were offered to the contractors.

As a practical remembrance of the open house meeting, the A. G. Brauer Company purchased and distributed to each contractor one copy of the new "Yardstick" of the National Warm Air Heating and Air Conditioning Association. This was the first extensive distribution of the "Yardstick" in the St. Louis area. In order that the complete story of the "Yardstick" might be told to contractors and the purposes for which the "Yardstick" was intended explained, J. D. Wilder, Editor of American Artisan, was invited to discuss the "Yardstick" in detail.

Mr. Wilder explained that the "Yardstick" was conceived and written by Professor S. Konzo of the University of Illinois Research Residence staff as a means of making available to home owners, builders, and architects, an easily understood measuring stick by which the home owner, builder or architect can judge the the value of any warm air heating installation offered by the warm air heating contractor. Some of the reasons behind the "Yardstick" were explained by the speaker and the method of using the "Yardstick" wherein the contractor attaches a copy to his proposal, requesting that the prospect study the proposed plans to see how the plan meets the recommendations of the "Yardstick" and, further, that all other plans and proposals submitted be likewise compared with the "Yardstick," was discussed in detail. The speaker then went through the "Yardstick" section by section, explaining why the various recommendations are included, what are the important features of the recommendations, what recommendations are especially important, and how these recommendations may be used to best advantage. Time was afforded for complete discussion of the various sections in the "Yardstick."

In addition to the discussion of the new booklet, a moving picture showing the production of steel from the mine to the finished product used by the sheet metal and warm air heating industry was shown through the courtesy of the St. Louis representatives for Republic Steel Corporation. This new film, recently released, pictures and explains in detail the modern methods whereby steel is produced for the industry.

Coming Conventions

Apr. 18-19—The Roofing & Sheet Metal Contractors' Association of Florida. Annual. Roosevelt Hotel, Jacksonville. L. A. Burgess, Secretary-Treasurer, 915 N. Poinsettia Ave., West Palm Beach.

May 8-9—Anthracite Industries, Inc. 4th annual anthracite conference. Lehigh University, Bethlehem, Pa.

May 15-16—Sheet Metal and Roofing Contractors' Association of Pennsylvania. 1941 Convention. Penn Albert Hotel, Greensburg. M. F. Liebermann, 1411 Merchant St., Ambridge, Pa.

LOOK HIM OVER! He's a champ in value! Good looking enough for the new house on the hill — and priced so that he's competitive even on large housing projects. Made with conventional single valve damper or with adjustiblade multi-shutter damper. Face vanes individually adjustable in a jiffy can lick the toughest problem of air distribution.

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ADJUSTIBLADE MULTI-SHUTTER AND SINGLE VALVE REGISTER

T & B

TUTTLE & BAILEY, Inc.

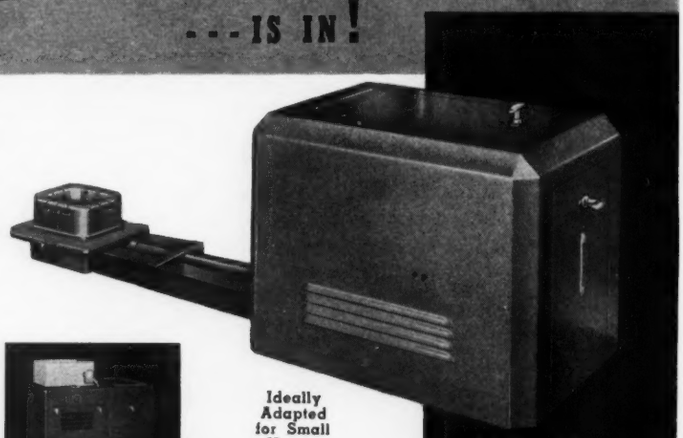
NEW BRITAIN, CONN.

NEW YORK CHICAGO PHILADELPHIA

THE "CONCO CLIPPER" ---IS IN!

● Even WE thought it couldn't be done! But here it is — the new "CLIPPER" — a master-built Conco Stoker that retails complete with automatic controls for only $129.50*. Small-home owners in your community will recognize the Clipper as the stoker they've been waiting to buy. This year the Clipper heads up Conco's complete line of domestic and commercial stokers, and gas and oil-fired heating and conditioning equipment. Write NOW "Get the facts on Conco first."

*(Does not include freight or installation.)



Ideally Adapted for Small Homes

CONCO OIL-FIRED AIRCONDITIONERS

CONCO CONVERSION OIL BURNERS

CONCO GAS-FIRED AIRCONDITIONERS

Conco s new "Flaming Forge" Burner is the Engineering Triumph of 1941!

FEATURES:

★ Finished in Green Hammerloid

★ Conco Magic Hand Controls

★ A Precision-Built Machine

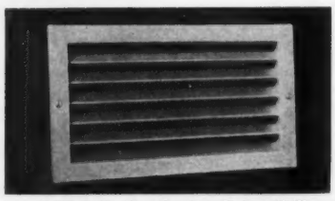
CONCO CORPORATION

79 EUCLID AVE. MENDOTA, ILL.

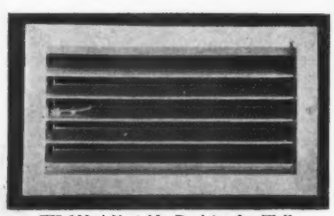
Waterloo REGISTERS

Quality....with Economy!

Compare Waterloo's exclusive Venetian-type registers with higher priced lines and you'll agree that Waterloo is tops in value. Adjustable supply registers and streamlined return grilles offer construction features, finishes, and flexibility ordinarily found only in custom-built units. Write for interesting free literature and prices. You'll find that many of the smartest looking, most popular Waterloo Registers are very attractively priced.



FGH-O-45 Venetian-type Return Grille



FH 100 Adjustable Register for Walls

WATERLOO REGISTER COMPANY

WATERLOO, IOWA SEATTLE, WASH.

Representatives in principal cities

With the Manufacturers . .

Branch Offices Moved and Opened

R. C. Allen

General Controls Co. of Glendale, California, announces a factory branch at 1100 Cadiz St., Room 202, Dallas, Texas. **Robert C. Allen,** sales engineer, in charge, with complete stocks of automatic temperature, pressure and flow controls.

Mercoid Corporation, Chicago, opened new headquarters in New York City at Room 1307 Equitable Life Building, 393 Seventh Avenue, on March 17. **R. F. Fisher** is Vice-President in charge.

◆

Personnel Appointments

James E. Wilson—appointed regional sales supervisor for the middle-western area for **Airtemp Division of Chrysler Corp.,** Dayton, Ohio, with headquarters in Dayton. Formerly regional sales manager in Michigan and Northern Ohio.

H. A. Malcom—appointed regional sales supervisor in the southern and western territories for **Airtemp Division of Chrysler Corp.,** Dayton, Ohio. Formerly metropolitan manager of Westinghouse.

Max Walten

Max Walten—employed by **Copper & Brass Research Association,** New York City, as a consultant in the proper application of sheet copper as a roofing material. In 1936 Mr. Walton retired from an architectural sheet metal construction business founded by his father in 1876 and became Inspector of Construction on various federal buildings under the architect employed by the United States Capitol.

William R. Lawrence, Northampton, Mass.—factory representative for Vermont, New Hampshire and the western portion of Massachusetts for **Harvey-Whipple Incorporated,** Springfield Mass. Formerly in charge of oil burner division, Merrill Company, Inc., Boston.

Mor-Mac Sales Co., 8742 S. Ashland Ave., Chicago—organized by M. A. Christiano and Arthur Cappelle to distribute Mor-Mac Tubular winter air conditioners manufactured by **Morrison Steel Products, Inc.,** Buffalo, in the Chicago area.

John W. Mock

John W. Mock—appointed sales manager of the **Liquid Fuel Appliance Division, The Turner Brass Works,** Sycamore, Ill., and will have charge of the 70th anniversary program which commemorates the company's founding in 1871.

Edward C. Stoever—manager of the agency and specialties division of the Northwestern District, **Westinghouse Electric and Manufacturing Company,** with headquarters in Chicago. Formerly manager of the Westinghouse Duluth, Minnesota, office.

KNOW ALL MEN

in the

HEATING

AIR CONDITIONING

and

VENTILATING BUSINESS

that

Asbestos Protected DUX-SULATION

is the accepted and approved insulating material for covering ducts to preserve and maintain temperatures . . . for lining ducts to prevent noise and sound travel . . . to save fuel . . . to prevent condensation . . . to balance system operation . . . to reduce insulation costs . . . to simplify application . . . to improve appearance.

DUX-SULATION is protected in U. S. and Canadian Patent Offices.

•

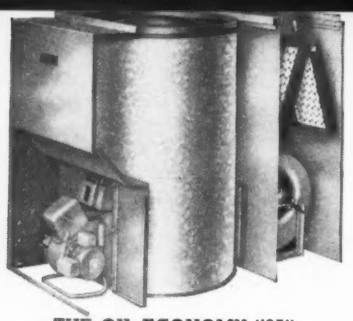
Write office nearest you for details.

GRANT WILSON, INC.
4101 West Taylor Street CHICAGO

PLANT RUBBER & ASBESTOS WORKS
537 Brannan Street SAN FRANCISCO

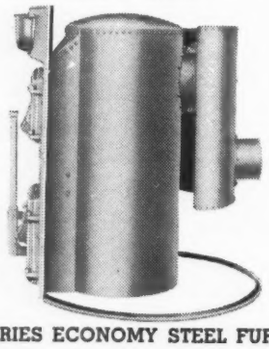
AIR CONDITIONING UTILITIES CO.
8 West 40th Street NEW YORK

ATLAS ASBESTOS CO., LTD.
110 McGill Street MONTREAL, CANADA

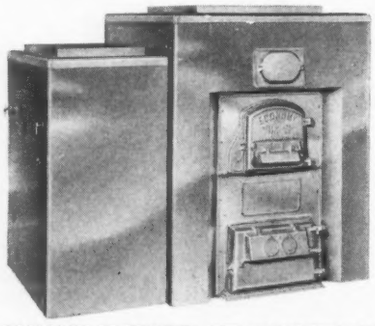


THE OIL ECONOMY "85"
The unit designed for the new type of smaller home complete with oil burner.

ECONOMY BLUE FRONT FURNACE
Available in sizes from 18" to 30" firepot—all rated by National Association.



100 SERIES ECONOMY STEEL FURNACE
Riveted and welded construction. Available in four sizes 20", 22", 24" and 27".



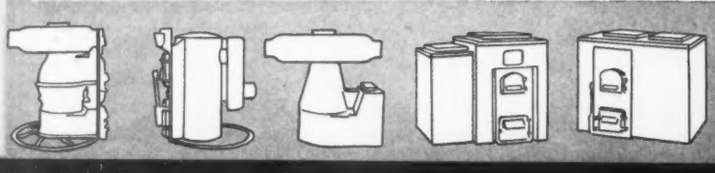
ECONOMY JACKETED AIR CONDITIONER
Blower may be installed on either side or the back—whichever is better for your installation. Built of cast iron.

A Complete Line of Heating Equipment

The International line is complete. In addition to above are units for large jobs for solid fuel and heaters of special design for oil, gas and stoker. Stocks carried with jobbers at all principal points. Write Department A-4 for further information.

INTERNATIONAL HEATER COMPANY
UTICA, N.Y. U.S.A.

WESTERN OFFICE AND WAREHOUSE • 1933 WENTWORTH AVE., CHICAGO, ILL.
NEW ENGLAND OFFICE AND WAREHOUSE • 110 CHESTNUT ST., NASHUA, N. H.
STOCKS CARRIED WITH WHOLESALERS IN ALL PRINCIPAL CITIES



Obituary

R. G. Evans

Robert Guilliford Evans was born in Salt Lake City in 1892. His attendance at Kearney Military Academy early aroused his interest in military affairs which he retained throughout his life. Joining the A. E. F., his early military training won him a commission. He was married to Catherine Hanley on the eve of sailing for France. He returned as a Captain and was commissioned a Major in the Reserve Corps.

Shortly after returning to Chicago he established a heating business which was later purchased by the Fox Furnace Company to become one of their retail branches. Mr. Evans remained as local manager. His success in this position won him the appointment of Manager of Retail Sales for the Fox Furnace Company, with branches extending from Michigan to the Gulf and east to New York City. Later Mr. Evans and his associates purchased the Chicago Branch, operating under the title of Sunbeam Heating & Air Conditioning Co. Their success was conspicuous.

Mr. Evans' crowning effort was the installation of the warm air heating equipment at Ft. Custer, located near Battle Creek, Michigan, in such a manner as to win the enthusiastic approval of the general contractor and the commendation of the War Department. Surviving Mr. Evans are three daughters, a sister and two brothers. Mrs. Evans passed away nine years ago.

"Bob" as he was known to his friends, will be sorely missed both in Chicago and by his many friends in the industry.

A. R. Meiche

A. R. Meiche, widely known as "Art" by the warm air heating industry, died suddenly March 26, 1941, following an emergency operation for appendicitis from which he apparently recovered satisfactorily a week or two before his death.

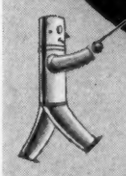
Art Meiche was one of the true pioneers in promoting the use of centrifugal blowers in warm air heating installations, starting to sell Furblo blowers in the Chicago territory in the summer of 1930. Mr. Meiche was a member of the Furblo organization continuously until 1940 when a change in company policies abolished direct factory representatives. In addition to selling blowers, Mr. Meiche began selling Chicago Filter Company filters in October, 1938, and was, at the time of his death engaged in this activity. Recently, Mr. Meiche also represented Viking Air Conditioning Corporation as sales representative in the Chicago area.

Art Meiche gave unstintingly of his time and energy to the advancement of mechanical warm air heating during the ten years—1930 to 1940. He was always available to dealers confronted with problems of design, installation, or service, and to this devotion to mechanical warm air heating was due much of the advancement of this art in the area served by Mr. Meiche. During the period when all warm air heating contractors were trying to learn how to design and install mechanical warm air heating systems, Mr. Meiche conducted schools for the various Chicago associations and gave talks before other local organizations in the Northern Illinois and Southern Wisconsin area. He ran Schools for jobbers and was much in demand as an instructor.

Art Meiche began his educational work when mechanical warm air heating was practically an unknown art to the average warm air heating contractor, and all during the time when this new industry was making progress, he contributed much to the practical engineering data of the period. His counsel was always eminently practical, and to his efforts is due much of the simplification which made mechanical warm air heating a possible field of activity for the non-technical contractor.

Mr. Meiche is survived by his widow Rose; by four daughters and one son; by four brothers and five sisters and four grandchildren.

KLAUER *Profit Tips*



SPEED WORK!
SAVE TIME!
SATISFY CUSTOMERS!
BOOST SALES!
CUT COSTS!
MAKE MONEY!

Double-Seamed END PIECES

Formed, not rolled, on Klauer's specially-developed, highly accurate, automatic machines. Made of heavy gauge deep drawing stock — double lock seamed — galvanized with pure zinc spelter after forming — then re-galvanized after assembly.

Gov't. Approved CONDUCTOR FASTENERS

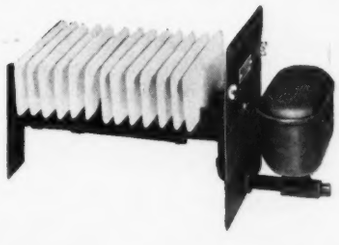
Specified on U. S. Government work for over 5 years! Copper or galvanized, for wood or brick. Made to offset pipe 1" from building. Priced to make money for you.

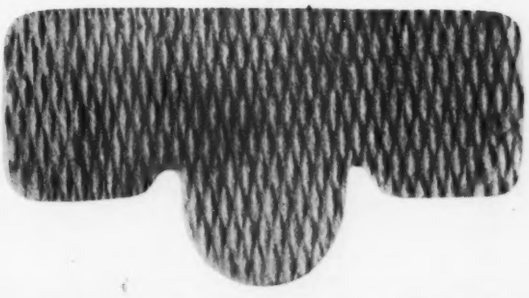
Attention Jobbers! Attractive franchises are now open to reputable jobbers (we never sell chain stores or catalog houses.) Write for details today.

Klauer SINCE 1870 MANUFACTURING CO., DUBUQUE, IOWA

- Roofs and Box Gutters, Valleys, Flashing
- Sheet Steel, Corrugated Sheets
- Skylights, Stock Tanks
- Ventilators and Cupolas
- Eaves Trough, Conductor Pipe and Trimmings
- Metal Ceiling, Pressed Siding, Rolled Roofing
- Metal Lath and Corners
- Ridging, Corners, Battens, Shingles

FOR INCREASED SALES and MORE PROFITS





HERE'S A COMBINATION THAT'S HARD TO BEAT!

● Let this Skuttle combination give your humidifier sales a lift this year. You really have something to talk about when you show a customer these exclusive features of Vapoglas and the Skuttle Model 300 automatic humidifier. Compare Skuttle with any other make of humidifier and convince yourself that Skuttle is the line you should handle for increased sales and bigger profits! Send for our dealer prices and catalogue today.

THE NEW SKUTTLE SERIES 300 AUTOMATIC HUMIDIFIER with the improved adjustable rear support and anti-syphon valve is finished in attractive black wrinkle with black vitreous enamel evaporating pan.

VAPOGLAS, SKUTTLE'S ALL GLASS EVAPORATING PLATES are a new, better and exclusive idea in evaporating plates. Vapoglas has more evaporating area because 5 Vapoglas plates are more than equivalent to area of a pan 7" wide by 30" long. SEND FOR FREE SAMPLE TODAY!

SKUTTLE *Sales* COMPANY

Air-Conditioning Equipment

999 FRANKLIN ST. • • • DETROIT, MICHIGAN

You May Match The Price —But You Can't Match The VALUE

SPX STOKER FURNACE

... and Winter Air Conditioner. Operated with Round Oak Stoker or any standard make.

ROUND OAK FURNACES

A Round Oak dealer seldom worries about cut-price competition ... for his business is built on the sturdy foundation of highest quality heating equipment, reinforced by the reputation for honest values which Round Oak products have held since 1871. His customers know that they can count on *more* than their money's worth from a Round Oak Furnace ... regardless of price. That's confidence ... the most important sales feature!

ALL SIZES AND TYPES

Take advantage of everything Round Oak has to offer, and you, too, will be fully equipped to cover the entire warm air field ... with cast and steel furnaces, air conditioners, oil burners and stokers. Cash in on all the extra sales and profits you have been missing. Don't wait another day!

BLENDED-IRON GRAVITY FURNACE

Write For Facts—

ROUND OUT WITH ROUND OAK

of Dowagiac, Mich.

THE COMPLETE LINE OF FURNACES OIL BURNERS AND STOKERS

News Items . . . . . .

Joseph C. Gardner

Joseph C. Gardner of Joseph Gardner Co., sheet metal and roofing contractors of Indianapolis, Indiana, celebrated his 75th birthday on Friday, March 28—also his 25th year as a Kiwanian.

◆

Lewis K. Sage Leases Harris Shop

Lewis K. Sage has recently leased the Harris Tin Shop, 1428 East Third Street, Bloomington, Indiana, from R. A. Harris, who was called to the army. Mr. Sage will continue to operate as in the past—sheet metal, heating, air conditioning, and all types of repair work.

◆

Blow Purchases Mielke Interests

Harold M. Blow has purchased Carl Mielke's interest in the Blow and Mielke Hardware and sheet metal business at Waupun, Wisconsin, and is operating it as the Blow Hardware store. Arthur Zilisch and Albert Gruhn continue as the sheet metal and heating workers with the firm.

◆

Buys Nohsey Sheet Metal Shop

Gustave Adolph Rasch and associates have purchased from Mrs. Kate Nohsey, widow of Henry Nohsey, the old established sheet metal shop at 230 Mulberry street, Memphis, Tenn., and will operate the business as the Memphis Sheet Metal Works. For many years it was Nohsey and Schwab. Mr. Schwab died several years ago and Mr. Nohsey in November, 1940. The firm, in its career of about 35 years, did much notable sheet metal work in up town Memphis and suburbs.

◆

Griffith G. Jones Honored

Griffith G. Jones, president-treasurer of the Mohr-Jones Hardware Co., Racine, Wis., and only surviving charter member of the Sheet Metal Workers Local 35(AFL), was honored February 21 at a smoker in celebration of its 44th anniversary.

Although Mr. Jones has the status of an employer, he is an honorary member of the union and the only survivor of 12 charter members. All employers of sheet metal workers were invited to attend the smoker. Membership of the union is in both Racine and Kenosha, Wisconsin.

◆

Coal Research

The program of Bituminous Coal Research, Inc., 803 Southern Building, Washington, D. C., includes domestic utilization of smokeless hand-fired stoves and furnaces.

Represented among the coal producers are 53 individual companies, 8 local associations and the National Coal Association.

In the field of automatic comfort heating, the engineers agree that efforts should be directed toward the development of equipment that will burn a wide variety of coals and that will remove ashes automatically.

◆

Domestic Burners for Pennsylvania Anthracite

The National Bureau of Standards, U. S. Department of Commerce, Washington, D. C., announces a Second edition of a Commercial Standard for Domestic Burners for Pennsylvania Anthracite (Underfeed Type—Commercial Standard CS48-40, a revision of CS48-34). This edition is now a recorded standard of the industry, effective for new production from November 30, 1940.

Printed copies of the standard will be mailed to non-acceptors only on specific request to I. J. Fairchild, Chief, Division of Trade Standards, National Bureau of Standards.

Among the many industries using Niagara foot operated gap shears are air conditioning and warm air heating contractors, metal sign makers, photo engravers, general sheet metal shops, vocational schools, and maintenance departments of large industrial plants.

18-inch gap makes it possible to shear sheets that are longer than the cutting length of the shear by making successive strokes.

Every working part is designed to save effort both in operating the shear and in handling the material.

Self-locking steel holddown is operated by eccentrics manually controlled. Operator can relinquish the holddown levers while he operates the treadle.

Niagara Foot Gap Shears are built in 36 to 72 inch lengths for 16 gage capacity. Write for Bulletin 80-D. Niagara Machine & Tool Works, 637-697 Northland Avenue, Buffalo, N. Y. Branches: Cleveland, Detroit and New York.

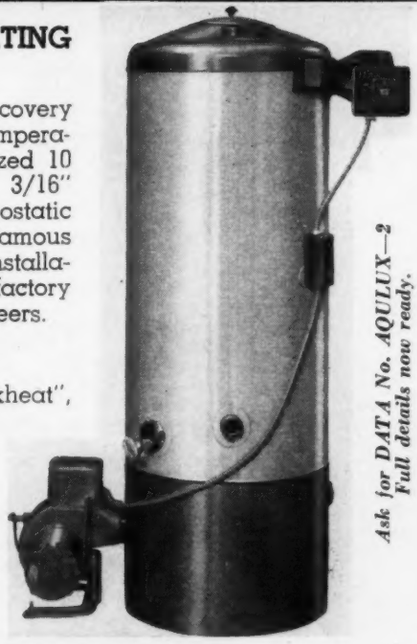
AUTOMATIC HOT WATER HEAT

OIL BURNING WATER HEATING UNIT

Output per hour 150,000 BTU or recovery capacity 180 gallons at 100° F temperature rise; heavy dipped galvanized 10 gauge "Copr-loy" steel shell; 3/16" heads; each unit put under hydrostatic test before assembly; fired by famous "Bankheat" burner. Basement installation often not necessary for satisfactory performance. Consult our engineers.

OIL BURNER

At the right is the Johnson "Bankheat", size BH-0 pedestal mounted, oil burner attached to AQULUX 150. It is completely automatic with master relay, combustion detector, aquastat with sight adjustable range, and wiring connections between instruments and burner for straight electric ignition.



Ask for DATA No. AQULUX—2 Full details now ready.

ONE UNIT GIVES TWO-FOLD SERVICE

The Johnson AQULUX 150 is the large capacity, oil burning, automatic water heater that is easy to sell and install and a very satisfactory heating unit for 5 and 6 room homes. It is also well adapted for use with forced circulation. Size over all—24" diameter by 66" height; 45 gal. capacity. It will deliver 180 gals. an hour of 100° temperature hot water, more hot water than the average family will ever need. AQULUX 150 is equipped for burning No. 3 CSG Fuel or Pacific Coast Diesel oil. Standard equipment includes "Bankheat" burner with special refractory firebox, master control and aquastat, draft adjuster, completely insulated and ivory colored enameled jacket with green trim. Burner control wiring is in a flexible conduit ready for easy connection at the time of installation. **COMPLETE ENGINEERING FOR YOUR HEATING PROBLEM IS GIVEN WITHOUT CHARGE BY THE OAKLAND FACTORY AND THE JOHNSON ENGINEERS AT THE PHILADELPHIA OFFICE.**

S. T. JOHNSON CO.

940 Arlington Avenue, Oakland, California
401 North Broad Street, Philadelphia, Pa.

"Stoker Sales are Blowing a Gehl"

EXCUSE US
IF WE BRAG A LITTLE

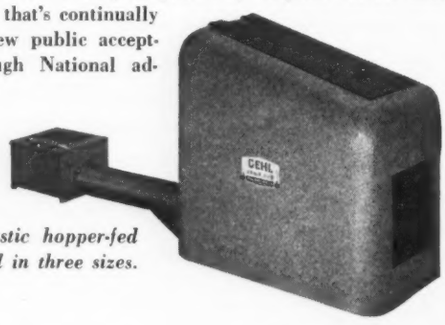
Dealers sometimes tell us that we have been far too modest in our claims about Gehl Stokers. Maybe so, but we have felt that the performance of the Gehl is its best recommendation, and the word must "get around" because

TWICE AS MANY

GEHL STOKERS

WERE SOLD LAST YEAR AS IN THE PREVIOUS YEAR

Why not sell the stoker that is engineered from the ground up in one factory—not an assembled job—no divided responsibility? Sell the stoker that has a cast-iron combination coal and air tube which offers effective resistance to basement dampness and fuel moisture. Sell the stoker that doesn't cut your profits by frequent service calls—a Stoker that's continually winning new public acceptance through National advertising.



Domestic hopper-fed model in three sizes.

Industrial and commercial models in various sizes.

Let us tell you more about the Gehl line. You can sell the Gehl to new and remodeled homes with a low payment down and up to THREE YEARS TO PAY, and under the Gehl unconditional guarantee.

WRITE today for literature and particulars of our dealer plan. Get going with Gehl.

GEHL BROS. MFG. CO.

Established 1867 — Dept. A, West Bend, Wisconsin

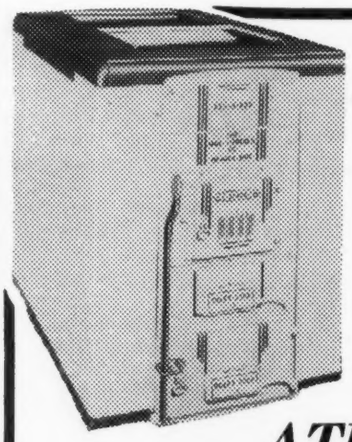
New York Convention

(Continued from page 87)

tributed definitely to the corrosion resistance of copper. Accordingly, said Dr. Wilkins, the Revere company now adds a small percentage of arsenic. Revere believes that this additional impurity eliminates the very small surface pittings which, it is now believed, contribute to the corrosion of copper. The addition of arsenic forms an arsenic oxide over the top of the copper and a practically smooth surface so that corrosion can not begin. This addition of an impurity, emphasized Dr. Wilkins, is not proposed as a cure-all for copper corrosion problems and correct mechanical application is still as important as ever. A testing laboratory has now been established to test under accelerated conditions all factors which influence the life of copper as an exterior material.

Konzo Presents "Yardstick"

A discussion of the new "Yardstick" by the National Warm Air Heating and Air Conditioning Association was presented by Prof. S. Konzo of the University of Illinois. Prof. Konzo has delivered this discussion at several state association conventions this year and his discussions have been reported. Prof. Konzo pointed out some of the conditions which necessitated the preparation of a book like the "Yardstick"; discussed the various regulations in the "Yardstick" section by section, pointing out the important regulations and those not so important; and explained how



★ Modern

★ Efficient

★ Durable

★ Economical

ATH-A-NOR
AIR CONDITIONING UNIT

The ATH-A-NOR Deluxe is designed to meet the ever increasing demand for a modern, efficient, durable and economical air conditioning unit. The new full height Front is pleasing in appearance as well as modern in design to enable you to sell the Home-owners who have new or recently modernized basements.

The ATH-A-NOR line of furnaces has a model to meet every price and every purpose. Available for coal, oil or gas firing, the versatility of these units make them standouts in the field.

We suggest you drop us a line today for further information.

THE MAY-FIEBEGER COMPANY

NEWARK — OHIO

the contractor can use the "Yardstick" to best advantage.

For the benefit of readers who have not previously heard of the "Yardstick," it may be said that the "Yardstick" is written in non-technical language, amply illustrated, and divides all the features of a warm air heating installation into Classes A, B and C; class A being excellent; Class B being passable, and Class C poor.

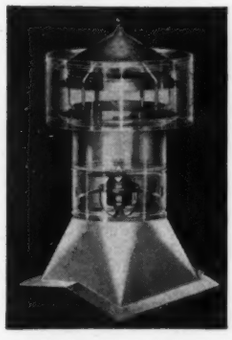
The construction of a furnace, the proper selection of blower, filter, control, mechanical firing devices, and other parts of the system are discussed and classified A, B, and C. Features of ducts, design and application are classified A, B and C. It is intended that the contractor shall present a copy of the "Yardstick" with each proposal and ask the purchaser to compare his proposal with the "Yardstick" to see that the proposal and the plans follow the recommendations of the "Yardstick."

It is further proposed that the contractor shall ask the prospect to compare all competitive plans and proposal against the "Yardstick" to see that all proposals and plans meet the recommendations of the "Yardstick." Copies of the "Yardstick" have been sold to the manufacturer members of the National Warm Air Heating and Air Conditioning Association and it is anticipated that manufacturer members will in turn distribute suitable quantities of the "Yardstick" to their dealers either free of cost or at a nominal price. The "Yardstick" is also intended to be given to operative builders and architects.

Brundage Explains Michigan's Plan

The New York State association is very much interested in stimulating convention attendance and both

BURT Ventilators and Burt Service Help You Get the Job.



Standard Fan

When competition for the job is keen, and specifications difficult to follow, turn to Burt for assistance. Burt makes any type, any size for any job . . . Burt prices give you a distinct advantage in bidding, with profit to you . . . and Burt Engineers are always glad to lay out plans and help you estimate. Whatever your need, Burt can fill it best. Write for catalogs.

THE BURT MFG. CO.
301 MAIN STREET AKRON, OHIO

You have ⅓ more wet strength* with Ruberoid 95% pure Asbestos Paper. Think what this means in easy application when paste is applied. This extra strength — obtained by a special processing — saves time — speeds up jobs — gives your customers extra values.

For Ruberoid Asbestos Paper has everything! Wet strength, accurate caliper, color and finish. The color is a soft natural blue-white. The finish is smooth on one side — rough textured for adhesion on the other side.

We urge you to try Ruberoid Asbestos Paper for wrapping furnace pipes — protecting air conditioning ducts, wood partitions, lining stoves, ovens and gas ranges. Mail coupon for free 5-foot test sample. Compare its wet strength, flexibility, color, finish and ease of application.

** Compared with the average Asbestos Paper on the market.*

For 1000°F. Temperatures ASBESTOS MILLBOARD

A special binder and filler gives you a millboard that will, with little change in its physical condition, withstand heat up to 1000°F. We know of no other commercial millboard to equal it.

RU-BER-OID
ASBESTOS PAPERS

AA-4

The RUBEROID Co., *Insulation Division*
500 Fifth Avenue, New York City

Send us your free 5-foot test sample of Ruberoid Asbestos Paper. We understand this places us under no obligation.

*Name*_____

*Address*_____

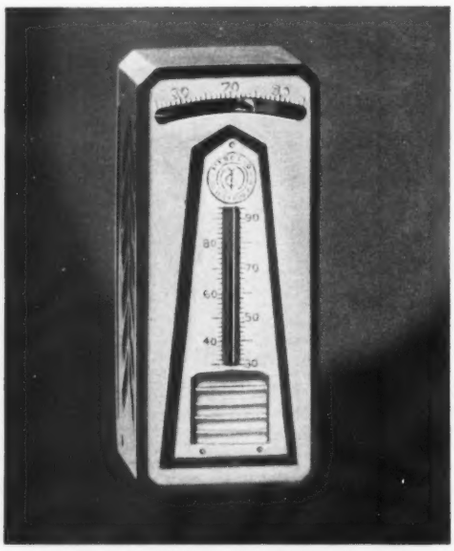
*City*_____ *State*_____

Since Ruberoid sells through wholesale trade only, please give jobber's name.

FREE THIS CANISTER CONTAINING *5 foot Sample*

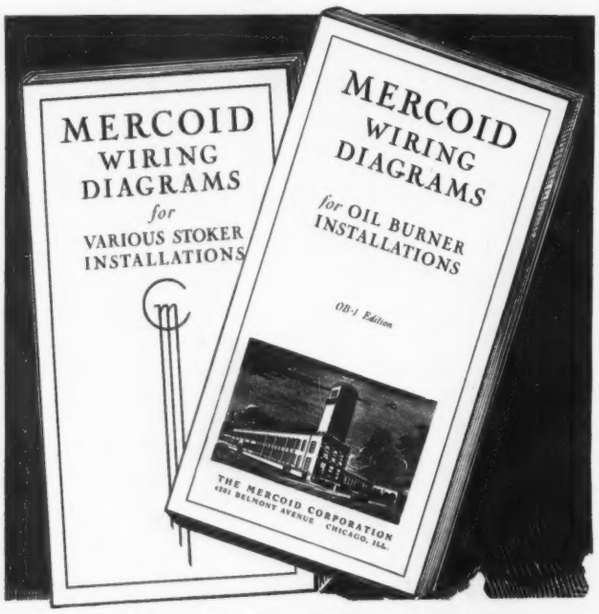
A PROVEN
TWO-STAGE CONTROL SYSTEM
BY
MERCOID

Two years ago, Mercoid introduced a new and better method of stoker control, designed to utilize stored-up heat in forced circulation warm air furnaces, and improve the efficiency of stoker heating. Results have been outstanding and the field is rapidly expanding its use of the system.



MERCOID TWO-STAGE SENSATHERM

This thermostat has all the fine operating characteristics of the Type H Sensatherm, except that it is provided with two stages. On a call for heat, the first stage utilizes the stored-up heat. In many cases this is sufficient to satisfy the thermostat. If not, the second stage starts the stoker—a sure avenue to more economical stoker operation and greater freedom from overruns.



MERCOID WIRING DIAGRAM BOOKLETS
Free to every serviceman who installs either oil burners or stokers.

THE MERCOID CORPORATION . 4207 BELMONT AVE. · CHICAGO, ILL.

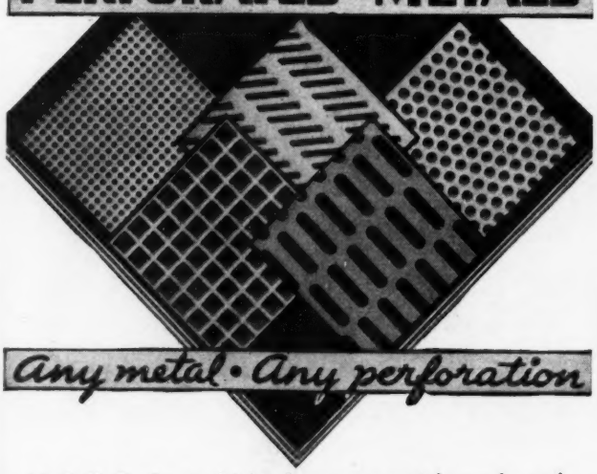
local and state membership in the organization. For the purpose of learning what some of the other associations are doing, the New York group invited Homer Brundage of Kalamazoo, member of the Michigan association, to explain the set-up in Michigan wherein the state association is divided into two groups—one, containing the warm air heating contractors and the second, the roofers. Mr. Brundage explained this set-up in detail and also explained how the Michigan salesmen's auxiliary co-operates with the state association in stimulating attendance at conventions as well as membership in the contractors' group.

In the Michigan set-up, the furnace group has its own officers and four districts with each district holding from one to four district meetings each year. The furnace group in Michigan has also proposed and is actively promoting the message of a state-wide licensing law for Michigan. The local group (wherever the state convention is held) finances the annual convention and provides one evening's entertainment. The salesmen's auxiliary registers their own men and collects their own dues. According to Mr. Brundage, there are no exhibits at Michigan.

Stoner Pledges Auxiliary Support

1940's New York Auxiliary president, Jack Stoner, reported that the Merchandisers' Auxiliary has made considerable progress during its two years of life. Membership has increased and interest in the auxiliary has widened greatly. Mr. Stoner recommended that the New York State association take into its membership the various local heating associations throughout New York State and that every effort be made to bring these local group members to the state annual convention. The Merchandisers will hold a summer party,

PERFORATED METALS



H. & K. Perforated Metals are accurately made and embrace a great variety of perforations for use in screening, grading, ventilating and straining of different substances.

Tell us your requirements and we will send booklet showing actual sizes of perforations.

The Harrington & King PERFORATING CO.

5649 Fillmore Street, Chicago - 114 Liberty Street, New York

place and dates to be announced later. The auxiliary is also contemplating local meetings with local associations of contractors as an idea of mutual benefit.

A stag party with entertainment was tendered to the contractors' organization by the auxiliary on Tuesday night with an excellent floor show and excellent attendance. The annual convention banquet was held Wednesday evening with another good floor show and also well attended.

OFFICERS FOR 1941

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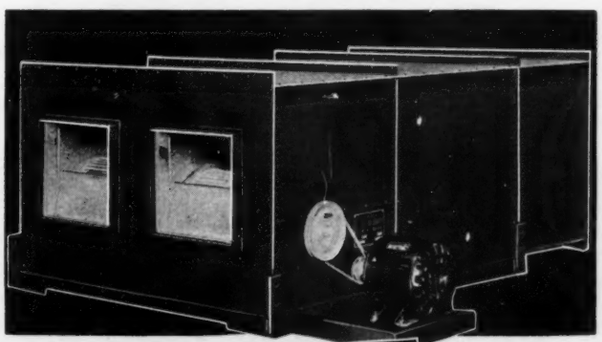


CLARAGE

Designed to control temperature and humidity within close limits. Can be made completely automatic in operation, regulated by room thermostat and humidistat.

Multitherm Units

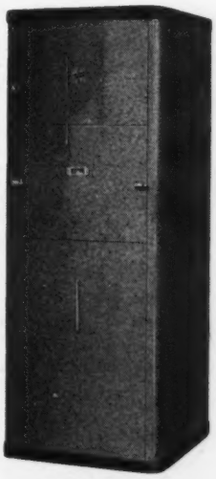
✓ Cooling
✓ Heating
✓ Complete Conditioning

Finest type of equipment available for small summer cooling, winter heating or complete year-round air-conditioning jobs. Widely used in factories, offices, stores, etc. Highly efficient; remarkably compact; easily installed in any idle space.

Write for Bulletin 107 describing various arrangements and giving capacity ratings.

CLARAGE FAN COMPANY
872 PORTER STREET · KALAMAZOO, MICH.
Sales Engineering Offices in all Principal Cities

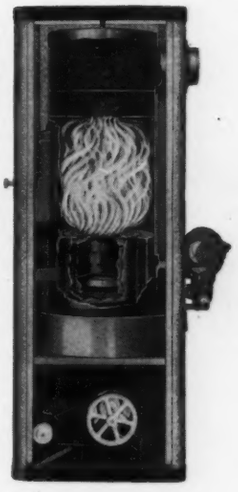
Monogram's
"Trouble-Free" Automatic Oil Burning Furnaces Offer You Greater Profits



Model No. 102

The MONOGRAM Upright Full Forced Winter Air Conditioner was designed primarily for smaller homes in which the furnace is installed in an utility room on the same level as the rest of the house. These units are proving to be very popular among the trade for they offer the utmost in automatic heating service — clean, healthful, humidified, conditioned warm air —at a minimum cost!

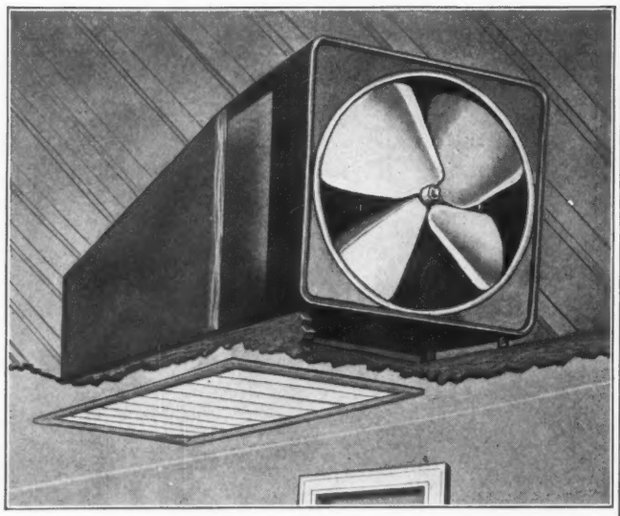
Like all other MONOGRAM oil burning furnaces these units feature the MONOGRAM "Vaporizing" Burner which has definitely proved to produce more heat from less oil, to produce a more clean, efficient combustion free from soot and carbon and to provide the user with a more dependable, trouble-free heating service. By using the same principle of combustion governing the gas burner, the "Vaporizing" burner produces a clean, quiet gas flame made from oil, operating with the highest known efficiency.



Write today for our 24-page illustrated catalog which gives complete information on the entire line of MONOGRAM Automatic Oil Furnaces. Only MONOGRAM can offer "trouble-free" heating service for only MONOGRAM has the "Vaporizing" burner.

THE QUINCY STOVE MFG. CO.
44th Year of Quality
QUINCY :—: ILLINOIS

When heating sales slump — be a COOLING MAN and earn EXTRA PROFITS!



ATTIK-PAK MODEL SHOWING AUTOMATIC CEILING SHUTTERS

From the sale of REX AIRATE Comfort Cooling

Heating men everywhere are becoming "cooling men" during their usually dull season. They have found that home ventilating equipment is a profitable spring and summer line, because it provides their customers with effective hot weather comfort at a reasonable price.

They have found, too, that the line to push is REX-AIRATE, because:—

...the "Attik-Pak" model, pictured above, comes complete with all-steel vent box and ceiling shutters;

...this model requires little time to install, leaving the seller more free for constructive sales effort;

...it is not necessary to cut profit margins to meet price competition, for REX-AIRATE offers features obviously worth the difference in price;

...there is a REX-AIRATE for every need priced from $49.90. For full details—

WRITE TO Air CONTROLS INC.

Division of the Cleveland Heater Co.
1937 W. 114th ST. CLEVELAND, OHIO

Honesty is Needed In the Attic Fan Field

(*Continued from page* 41)

lies in the hands of the dealers. The remedy is to buy only from manufacturers with a reputation for honest goods, honest dealings, honest claims.

The second basis for silence must lie with the contractor. He must install his system according to hard-learned principles which establish maximum fan RPM; maximum velocities for air passing through exhaust grilles; certain methods of damping out vibration; certain sizes of grilles, fan housings, ducts, if any, plus the use of materials which absorb noise.

These guarantees of silence (given the proper fan) are now well established and widely disseminated. The smart contractor goes out of his way to follow these principles because he has learned that one dissatisfied customer makes far more noise than several dozen satisfied users.

If the coming summer is to see the tremendous increase in the sale of attic fans forecast, the manufacturers must produce well designed, honestly-rated units and the dealer must buy honest equipment and make honest installations.

QUALITY EQUIPMENT-- FROM HESS-- COSTS LESS

DEALERS---Write for our New 1941 Portfolio

By selling — repairing, modernizing or replacements, needed by owners of a majority of heating plants now in use.

HESS BLOWER FILTER UNITS
HESS WELDED STEEL FURNACES
HESS AUTOMATIC OIL BURNERS
HESS AUTOMATIC COAL STOKERS

ARE GREATEST VALUES AT LOWEST PRICES

The Hess line is complete for every dealer requirement, distinctively different and more saleable. Financing plan and territory plan—helps Hess dealers.

WRITE FOR DEALER PORTFOLIO
HESS WARMING & VENTILATING CO.
1211-27 S. WESTERN AVE. Founded 1873
CHICAGO, ILLINOIS

Arnold Kruckman's Washington Letter

(*Continued from page* 43)

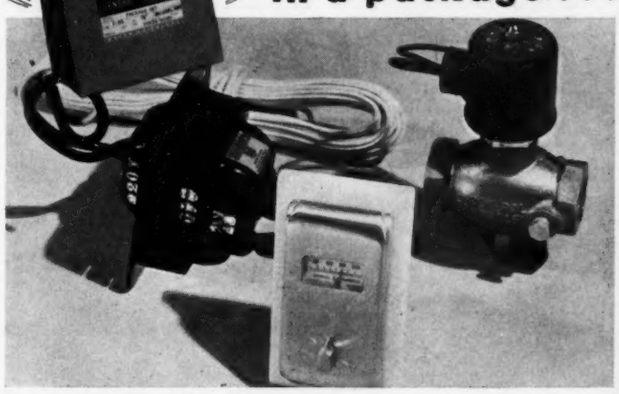
the speed up that is deemed imperative, private work must increasingly be abandoned and the effort of all shops must be focussed on defense work. It is clear why Government people, off the record, anticipate that all those who work with metals and with allied products, believe most, if not all, of this section of the national economy will work on Government contracts in the day ahead.

"Accessories to Living" May Be Shelved

The significance of this statement is further amplified by the cautious suggestion from Government sources that the pending tax changes may include "deterrent" taxes, taxes making the purchase of some commodities practically prohibitive. There has been mentioned such tax on materials for private building, on equipment like refrigerators, metal containers for some private uses, on some plumbing equipment, radios, and even on hardware. Doubtless the law may be written so as to enable its administrators to expand the list of things to which deterrent taxes may be applied. When you bear these possibilities in mind it is understandable why it is wisdom for all producers who work with metals and similar materials to integrate their plans with an understanding of the objectives of the Defense Contract Service.

Meanwhile the sheet metal contractor and his brothers and cousins and related industries to more remoter degrees of economic consanguinity is advised

WRAPPED UP
in a package . . .



Everything YOU NEED FOR SAFE, SILENT AUTOMATIC CONTROL OF GAS-FIRED BOILERS, WARM AIR FURNACES, ETC.

This General Controls T-30 Gas Heating Package Set is one of the most popular of America's most complete line of automatic gas heating package sets. It includes a humless Type K-38 Gas Valve, the new, handsome T-70-1 Trimtherm, transformer, and 30 feet of wire. Night shut-off and heat anticipation available. Similar sets are available for wall and radiant heaters and gas-fired steam radiators and also for use with butane gas.

WRITE FOR NEW 1941 COMPLETE CATALOG

GENERAL CONTROLS

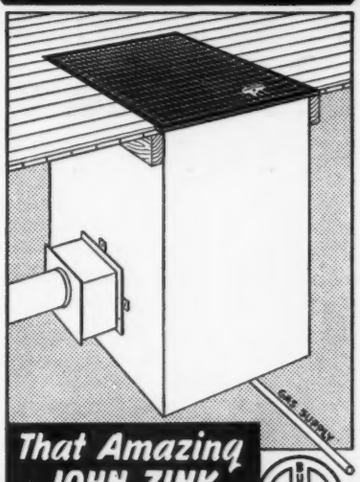
450 East Ohio Street, Chicago, Illinois — 267 Fifth Avenue, New York City

BRANCH OFFICES AND STOCKS IN ALL PRINCIPAL CITIES

JOHN ZINK

One of the largest manufacturers of Gas and Oil Burners in the world manufactures a - - - - - - - - -

FLOOR FURNACE



That Amazing JOHN ZINK FLOOR FURNACE

As you would expect this Furnace features a larger, improved combustion chamber and a One-port Non-plugging Gas Burner.

John Zink Low Pressure Burners

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DOMESTIC FURNACES
HEATING BOILERS POWER BOILERS
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Aggressive Dealers Write for Details

John Zink Company

4401 S. Peoria Ave. Tulsa, Okla.

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Kleenflo
AIR FILTER PANELS FOR
AIR CONDITIONING AND
VENTILATING SYSTEMS

LINT

IS NO PROBLEM WITH
THIS FILTER PANEL

● Lint, always present in considerable quantities in the air of homes and many business establishments, usually presents a serious problem for conventional types of air filters. Unless the filter panel is properly constructed lint will soon clog it to the point where efficiency of the air conditioning unit is seriously impaired.

The scientific construction of AIR-MAZE *Kleenflo* air filter panels, with their unique series of screens of graduated density, is especially effective against lint. Heavier lint is caught on the face of the deeply crimped outer screen where it can be easily brushed off because of the smooth round wires to which lint cannot hold fast. There's no clogging to obstruct free flow of air because even fine lint is no "bugaboo" for *Kleenflo* panels.

Lint can be easily brushed off the AIR-MAZE Kleenflo Filter Panel.

Because they are so efficient and because they need no replacement AIR-MAZE *Kleenflo* filter panels are economical. Easily cleaned at a cost of only a few cents. Of all-metal construction—odorless—sturdy and easy to handle as they slip readily into existing panel spaces. ***Approved by the Underwriters Laboratories.*** Write for detailed information.

AIR-MAZE CORPORATION
5130 HARVARD AVE., CLEVELAND, OHIO

AIR-MAZE
DEPENDABLE AIR FILTERS FOR EVERY APPLICATION

to get acquainted with other branches of Government that may directly have immediate need for their products. There is the Navy which is building ships in yards outside of the Navy centers. Huge quantities of metal work are needed on these ships that must be secured from subcontractors. "An unlimited number of sheet metal products are required from outside subcontractors," observed a Government man. The builders and the Navy have already found themselves blocked in the effort to make speed by lack of knowledge of the immediate whereabouts of the essential subcontractors.

Register Your Facilities

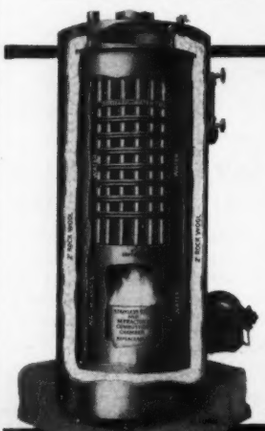
It is urged that readers of American Artisan list their facilities with the Navy, either in Washington at the Bureau of Supplies and Accounts, or in the many local offices of the Bureau scattered around the country. Incidentally, everywhere you go in Washington, they suggest that the business man be urged to write instead of coming to Washington; and most of all that he be urged to make his contacts with the offices nearer his home base. In the case of the jobs in the shipbuilding plants it is suggested that you get in touch with the shipbuilding plants on the West Coast, the Gulf Coast, along the Atlantic seaboard and up in the Lake region of the middle West.

The U. S. Maritime Commission has contracted with a number of non-Government shipyards to build hundreds of ships. Orders for more ships are being distributed. Every one of these ships have the same need for metal work by subcontractors that is present in the ships built under Navy contracts. Go to the shipyards to get the subcontracts, is the suggestion at headquarters here.

ALDRICH *ELIMINATES* FUEL UNITS
NO MORE CLOGGED NOZZLES!

● Aldrich leads again! *Fuel units* are *eliminated* — and with them most of the expensive field service work that cuts your profit. Aldrich uses a simple pump and valve arrangement — valve in the nozzle where it should be. It's a *better* fuel system. Makes possible our exclusive "liquid cooled" nozzle — eliminates carbon formation in nozzles. Get complete facts!

Aldrich fuel pump seldom needs servicing — but if it ever *does* have to be replaced it costs only about *half* as much.



HEAT-PAK BOILER...
Opens the profitable
home heating market to you!

● Standardization and volume production have produced this long-lifed, remarkably efficient, high-quality HEAT-PAK Boiler for steam or hot water. You can sell it *profitably* at a price that's competitive with warm air heating! Comes complete with burner, combustion chamber and controls. Tankless type coil for year 'round domestic hot water. Get all the facts on the Aldrich complete line of burners and oil-fired boilers and water heaters NOW.

ALDRICH COMPANY • WYOMING, ILL.

In a few weeks new orders will be placed by the Quartermaster Corps for enormous quantities of rolling equipment, all of which will require metal work that can most efficiently be supplied by subcontractors. The nerve center for this work and other similar work, is at Camp Holabird, Baltimore, Md. It has been suggested that subcontractors who think they are qualified to engage in this work write to the Quartermaster Corps at Camp Holabird, listing the facilities of their plants. In fact the same listing should be supplied to the Bureau of Supplies and Accounts of the Navy and to other branches of the Army.

Some Items Now Being Fabricated

The various branches of the Services have need for subcontracting metal work on motors, aircraft, heavy munitions, shell cases, packing cases, heavy castings; and it is mentioned particularly that the Signal Corps needs much metal equipment that must be made by subcontracting facilities. They use huge quantities of boxes, cases, containers, all made of metal. The supplies are needed in the field as well as in the camps and cantonments. The Quartermaster Department obtains an enormous number of small items made of metal, such as metal first aid kits. They tell me here that metal will be used in this man's Army for little things as it has never before been used in any Army.

It is estimated very roughly that the entire Defense budget for this fiscal year may run as high as 40 billion dollars in cash and authority to make contracts. Aside from the 7 billion dollars already provided for assistance to the fighting nations abroad, it is suggested another total of $11,290,000,000 may be required before this fiscal year has closed.

Premier FURNACE CLEANER

MAKES SPRING YOUR "BUSY SEASON"

Clean furnaces make warm friends for you—and cleaning jobs unearth plenty of profitable leads! With Premier's powerful one-man furnace cleaner you're all set to make all these spring months pay good dividends. This sturdily built cleaner works cold or under fire—and does double duty as a blower when required. Business promoting postcards are available to help you develop prospects. Write today for full information.

NEW IMPROVED MODELS
Completely Equipped

5/8 H.P. . . . $69.50
1 H.P. . . . $89.50

Complete Chimney Cleaning Equipment Only $9.00.

ELECTRIC VACUUM CLEANER CO., INC.
1730 Ivanhoe Rd. • Cleveland, O.

NO BETTER NAME THAN

COLE

Cole's Gas Fired Floor Furnaces Are the Quick-Selling Answer to Scores of Heating Questions

Selling Cole's Gas Fired Floor Furnaces pays big dividends in dollars and in customer satisfaction. In new homes for the finest in low cost automatic heat, sell Cole . . . for old homes, replacement jobs or for auxiliary equipment, sell Cole. NOW is the time to talk Cole's Gas Fired Floor Furnaces and NOW is the time for you to cash in on the demand for economical, trouble-free, dependable heat.

Cole Gas Fired Floor Furnaces are approved by the AGA. A full vitreous porcelain enamel inner heating unit assures the most in durability and efficiency.

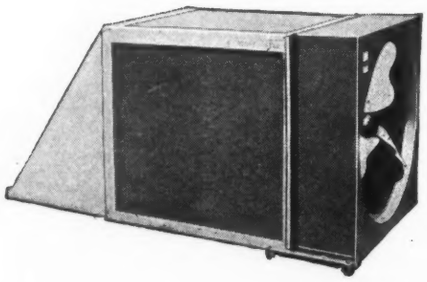
Other features include large heating surface and long delayed flue travel for maximum heat from any gas; unit crimped and sealed by a patented process for gas tight and stay tight construction; three walled casing of galvanized steel or full porcelain casing at small extra cost.

Combination safety pilot and automatic thermostatic control also available.

Write for full details today!

AMERICAN GAS ASSOCIATION · APPROVED · CONFORMS WITH NATIONAL SAFETY REQUIREMENTS

COLE HOT BLAST MFG. CO.
3108-26 WEST 51st STREET • CHICAGO, ILL.



SELL HOME OWNERS

Low Cost Air Cooling

Summer home cooling, once considered too costly for the average family, can now be enjoyed by every home owner.

Attic ventilation — the VIKING way — brings it within reach of the modest budget. This is BIG NEWS that means increased sales and substantial profits for you this spring and summer.

VIKING ATTIC FAN

Practical and Economical

For Any Type House, Large or Small

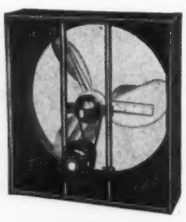
The VIKING Attic Fan is easy to install in any home. Its principle is simple, practical and natural. The large, silent, efficient fan expells the hot stifling inside air and brings in a gentle refreshing breeze of cool night air through the open windows. As soon as the sun goes down the VIKING Attic Fan starts its cooling action, bringing delightful comfort that relaxes and makes restful sleep possible.

The VIKING Attic Package is complete with a standard VIKING Fan unit, sound-proof vent box, automatic ceiling shutter and everything needed for installation. A triumph of VIKING engineering, thoroughly tested and endorsed by thousands of satisfied users as efficient, dependable and economical in operation.

VIKING VENTILATING FANS

For Commercial Use

VIKING Exhaust Fans in a wide range of types and sizes provide the practical solution to the comfort cooling and ventilation problems of many commercial establishments including restaurants, stores bakeres, dairies, hotels, clubs, offices, funeral parlors, industrial plants, clubs, dance halls.



Write for complete specifications, prices and sales helps

VIKING AIR CONDITIONING CORP.
9506 Richmond Ave. Cleveland, Ohio

Big Sums Have Been Concentrated—But Won't Be

Of course these sums will not all be spent this fiscal year. It would be impossible to spend, or even to initiate the spending of these colossal sums. But you get a good idea of the demands upon us when you contemplate these figures. In the past eight months the Army and Navy have awarded defense contracts totalling $12,575,869,000 and have certified plant expansions totalling $2,138,000,000. The OPM recently pointed out that 12,000 contractors shared roughly a total of something over a billion dollars worth of these contracts, while a few hundred contractors received some 11 billion dollars worth of contracts. Despite the understandable tendency to suspect undue favoritism in such disparity it is a fact that contracts have been distributed to those who were deemed most competent to fulfill them swiftly. Much has been done unavoidably because "time is not available to permit careful planning for really complete utilization of industrial equipment." The job of the Defense Contract Service now is to coax, urge and eventually force the spreading of the details of these contracts, to secure action and speed and to enable the constituent parts of the national economy to benefit as widely and as numerously as is possible.

◆

Shop Fabricated, Ornamental Marquee

(*Continued from page 73*)

The ceiling of the center arch is 18-gauge sheet without any plywood backing.

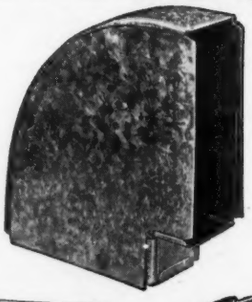
The photograph shows that exposed structural

AJAX

PREFABRICATED DUCTS—FITTINGS

for **Forced Air and Air Conditioning Installations**

24-hour Delivery Service



Our Engineers Are At Your Service

Our Catalog "A" (Gravity Fittings), Catalog "B" (Forced Air Fittings) are yours on request.

THE CINCINNATI SHEET METAL & ROOFING CO.
Furnace Fitting Department
230 E. Front St. Cincinnati, Ohio

framing appears square and heavy. This effect was obtained by boxing each structural member in a galvanized iron assembly fastened to and supported by the top of each structural member.

The striking appearance of the marquee is the "loud" colors used. The horseshoe and dragons are vivid red. The arch ceiling is bright yellow. The boxed beams are vivid red. The copper tile are green and this green was obtained by a fast working, artificial patina. The formula used for the patina was 5 pounds of salt in 10 quarts of water to which was added 2 boxes of snuff. G. W. Tourville, of General, reports that this mixture obtained a green quickly and has shown no signs of fading.

◆

American Brass Officers

The Board of Directors of The American Brass Company, a subsidiary of Anaconda Copper Mining Company, has announced the election of the following officers and directors to fill existing vacancies:

Chairman of the Board.....John A. Coe
President .....Clark S. Judd
Executive Vice President.....Arthur H. Quigley
Secretary and Treasurer.....Edwin J. Rockwell
Comptroller .....W. Kenneth Daly
Assistant Secretary.....Charles E. Steele
Directors....Arthur H. Quigley and John A. Coe, Jr.

John A. Coe has served as president since 1920. Clark S. Judd was formerly vice president in charge of manufacturing operations. Arthur H. Quigley was vice president in charge of the Detroit and Kenosha Branches. W. Kenneth Daly is also comptroller of Anaconda Copper Mining Company.

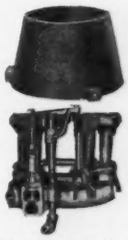
A MONEY MAKER FOR YOU!

★ "PACIFIC" A-80 is a furnace that will warm your heart . . . fatten the old bank account and make your customers happy for evermore! It's built in two *easily handled* sections. Interchangeable casing panels and reversible blower permit quick and easy transposition of Heating and Blower Units, in the shop or on the spot. Simply bolt them together when you've decided on the best arrangement. It saves you effort . . . saves you time . . . saves you money. And your customer gets a gas-heating and ventilating unit of utmost efficiency, low cost operation, long reliable service and *lower initial cost* than the same elements in a single cabinet.

★ Give your business a lift with this 1941 money-maker...the *"Pacific" A-80.*

Write Dept. AA-3.
PACIFIC GAS RADIATOR CO.
Huntington Park, Calif.

"Pacific" Round Heating Element, an innovation in gas furnace design. Recovers a higher percentage of heat units to input than any other heating element. Rigid, durable, welded gas-tight, leakproof.



"Pacific" Multi-Tubular Burner produces maximum flame temperature . . more heat at less cost. No adjustments required. Heavy cast-iron fire-box liner above protects side walls of element.

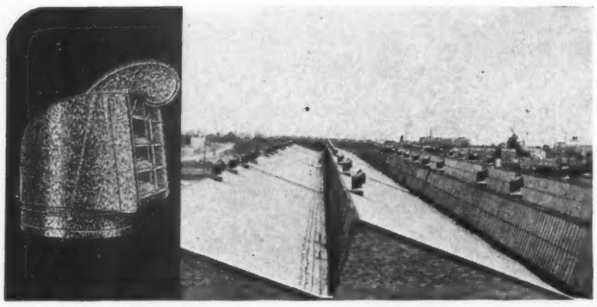
This FREE CATALOG will help you select the WELDER you need
Send for it today

Let me show you THE WELDER that will give you BETTER AND QUICKER WELDING
IT TOPS THEM ALL
4 SIZES TO CHOOSE FROM
EMERSON ELECTRIC
A-C ARC WELDERS

Choose wisely. Find out about all four new models before you decide!

Emerson-Electric, Multiple-Service A-C Arc Welders cost less to buy, less to operate, less to maintain, give longer service. Continuous duty. APPROVED by UNDERWRITERS'. Sizes: 75, 150, 200 and 300 Amp. models. Up to 30 welding heats. Take rods up to ¼" diameter! Portable, compact, streamlined. Wide variety of uses, from home and garage service to heavy castings and structural steel. Before you buy ask for catalog No. 516.

THE EMERSON ELECTRIC MFG. CO. • ST. LOUIS, MO.



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come to your shop when you feature
Swartwout ROTARY Ventilators

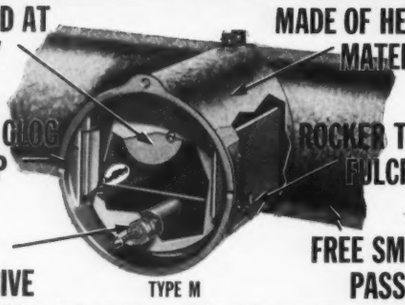
Your top-notch equipment jobs are your best advertisements. You can "land" plenty of profitable contracts when you can say—"we installed those Swartwout Rotarys on the Blank Building."

And you can honestly promise *more capacity for the size of ventilator used* and a lifetime of trouble-free operation. Get full details now—don't miss any chances to sell a profitable Swartwout Rotary installation. Write today for prices, discounts.

The Swartwout Company, 18615 Euclid Ave., Cleveland, O.

Swartwout
VENTILATION SPECIALISTS

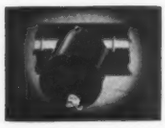
THE PATENTED **FIELD**
BAROMETRIC *Draft Control*



BALANCED AT FACTORY
MADE OF HEAVY MATERIAL
DOESN'T CLOG OR WARP
ROCKER TYPE FULCRUM
QUICKLY RESPONSIVE
FREE SMOKE PASSAGE
TYPE M

The most efficient draft control ever designed for constant use, year after year. Easily installed—no servicing. In a full range of sizes. Write for details.

TWO MORE OUTSTANDING FIELD CONTROLS



6" TYPE "U"

The Field Control line is complete with the 6" Type "U" control for coal and oil-burning heaters and the motorized Type "M" Control in sizes up to 20". Also a complete line of commercial Controls. Write for literature.

MOTORIZED

FIELD CONTROL DIVISION MENDOTA, ILLINOIS

Installation and Use of Attic Fans

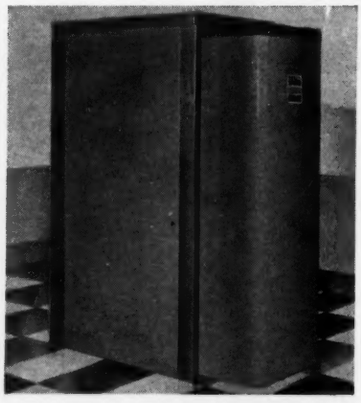
(*Continued from page* 60)

disturbing as little as possible the cool air in the remainder of the house, but exhausting the hot stagnate air from the attic. When the fan is used during the day, air should always be drawn in from the shady side of the house, because it is ordinarily several degrees cooler than on the sunny side. On rainy days the outdoor temperature is ordinarily cooler than the temperature indoors; therefore, the house may be thrown open, and the fan turned on. It is seldom advisable to draw in outdoor air that is hotter than the indoor air. When considerable heat is generated in the kitchen as in baking or canning, it is advisable to close off as much of the house as possible and pull all the air through the kitchen to carry off this excess heat.

Two-Speed Blowers for All-Night Operation

In certain sections of the country it may be necessary that the unit run all night, and in applications of this kind a two-speed motor is desirable. The unit should be turned on at high speed during the early part of the evening, and

SUN
FUEL MASTER



AUTOMATIC OIL FURNACES
MUST be Good!

Write Today

J. V. PATTEN COMPANY
200 DeKalb Ave. **Sycamore, Ill.**

on retiring, the unit should be turned to the low speed and left running at reduced speed the remainder of the night. In exceptionally hot weather, it may be desirable, of course, to continue operating at high speed the entire night.

In other sections where there is a considerable drop in temperature after sundown, it is not necessary to have a two-speed unit as the fan can be turned on until the time for retiring and then cut off entirely, or may be turned off an hour or two after retiring by a time switch, because usually the house will be lowered to a satisfactory temperature by that time.

The two-speed motor is desirable also for early summer and late fall operation because the slower speed gives a reduced air movement for these cooler nights. Many times ventilation is desirable in cool weather but is uncomfortable if the installation is sufficiently large to be satisfactory during the hot months.

The problem of eliminating the smoke nuisance when entertaining people who smoke is simple with an attic fan, even in cold weather, for when the air turns blue with smoke, the attic fan may be turned on, and in a very few minutes the air will be cleaned and clear again.

[To be continued.]

WHITNEY LEVER PUNCHES

No. 4B PUNCH

Length 8½ inches. Capacity ¼-inch through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies—⅜" to ⅝" by 64ths.

No. 6 PUNCH

Length—26½ inches. Capacity — ¼-inch hole through ⅜-inch iron; especially adapted for button punching or templet work. Punches and dies 1/16" to ⅜" by 32nds.

No. 91 PUNCH

CAPACITY

½-inch hole through ¼-inch iron; ⅝-inch hole through ⅜-inch iron; 2-inch hole through ¼-inch iron. Depth throat, 5 inches. Weight, 82 lbs.

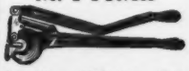
We have tools for every purpose needed by Sheet Metal Contractors.

Ask your Jobber.

No. 1 PUNCH

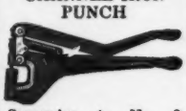
Length — 34 inches. Capacity — ⅝-inch hole through ¼-inch iron. Punches and dies in sizes from ⅛ to ⅝ by 64ths.

No. 2 PUNCH



Length — 23 inches. Capacity — ⅜-inch hole through ¼-inch iron. Punches and dies in sizes ⅜-inch to ½-inch by 64ths.

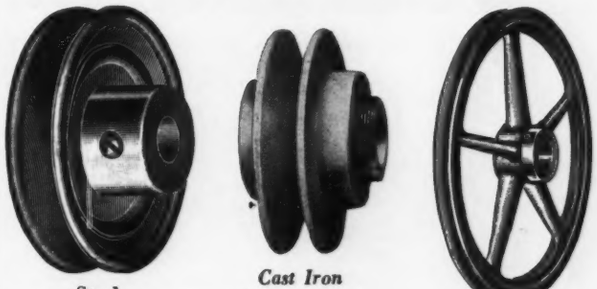
CHANNEL IRON PUNCH



Companion to No. 2 Punch. Every part of the two Punches Interchangeable, including punches and dies. Capacity—¼-inch hole through ¼-inch iron.

W.A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

Those Who MUST Have
DEPENDABLE PERFORMANCE
***Choose* MAUREY V-PULLEYS**



Steel — *Cast Iron Variable Pitch* — *Cast Iron*

Heating and Air Conditioning Plants, Refrigeration Units, Fans, Blowers, Stokers and similar installations MUST have dependable V-Pulleys for F. H. P. Transmission.

Manufacturers of apparatus of this kind have found that Maurey V-Pulleys installed in their units assure unfailing dependability that can be guaranteed against "break-down" caused by pulley failure.

When considering V-Pulley requirements, be sure to compare Maurey V-Pulleys with any other V-Pulleys made, for Design, Workmanship, Appearance and Performance.

Write for Circulars Describing Maurey Steel, Cast Iron, and Variable Pitch Diameter V-Pulleys.

MAUREY MANUFACTURING CORP.
Wabash at 29th Street, Chicago, Illinois

QUALITY-BUILT QUIET-AIR BLOWERS

COMPETITIVELY PRICED . . . . SOLD DIRECT
TO MAKE YOU MONEY

★ Delivers more air per revolution than any other blower of its size.
★ Patented motor mount automatically maintains proper belt tension.
★ Extra heavy construction for long life. No chatter. No vibration.
★ Exclusive fan design for greater capacity. QUIETER, almost noiseless.

PATENTED BEARINGS *GUARANTEED* FOR FIVE YEARS

Self-aligning — self-lubricating. Require no attention. No rubber to deteriorate.

Here's the blower you've been hoping for! Quality-built, yet competitively priced and sold direct from factory to you. *Gives you extra profit.* Get the facts on QUIET-AIR—full proof that it's a new profit opportunity for you!

MAPLE CITY STAMPING CO.
PEORIA, ILLINOIS

THERMO-DRIP
Automatic HUMIDIFIER

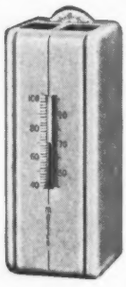
OPERATES IN UNISON WITH THE HEAT OUTPUT OF THE FURNACE

BONNET temperatures up or down, the THERMO-DRIP varies the water feed to the vapor pan precisely according to the heat output of the furnace . . . *automatically!* Thus, vaporization is kept tuned to indoor temperatures for better health, greater comfort — and for increased customer satisfaction with furnace heating. Push THERMO-DRIP. Selling *controlled humidity* is easier than selling "just humidity," especially when it costs no more.

Ask Your Wholesaler or Write Us for Complete Details

AUTOMATIC HUMIDIFIER CO.
18th and Main Streets CEDAR FALLS, IOWA

ACCURATE DEPENDABLE



MASTER
HEAT REGULATOR

TYPE A-23

Popular priced, yet noted for its long life and trouble-free operation.

Carefully designed for maximum efficiency, this positive, snap-action regulator operates on a differential of only ½ degree.

Build goodwill and satisfied customers by equipping all heating plants with Master Heat Regulators.

Write today for bulletin giving complete information on the Master line.

Makers of Dependable Regulators for 25 Years.

WHITE MFG. CO.
2368 University Ave. ST. PAUL, MINN.

Neubecker's Elbow Pattern

(*Continued from page* 56)

square section $P°$ or 1½ inches for each cheek side, a slight bend must be made in each side of the cheek pattern to make up this difference or twist. This necessitates drawing a line from *3* to *7* in the side elevation and finding the true length of this line as follows: Take the length of *3-7* in side elevation and set it off on any line as 3^v-7^v at the right. At right angles to 3^v and 7^v from points 3^v and 7^v draw lines as shown and make 7^v-*d* and 3^v-*e* equal respectively to one-half of the narrow side in section *P* or 2 inches and one-half of the square side in section $P°$ or 3½ inches. Draw a line from *d* to *e* in the true length diagram, which will be the *true length* of the line *3* to *7* in side elevation.

The cheek pattern can now be laid out: Take a reproduction of *1-2-7-8* in side elevation, and place it at the upper right as shown by similar numbers. Now with 2^x-3^x in the throat pattern as radius and *2* in the cheek pattern as center describe a short arc near *3* and intersect it by an arc struck from *7* as center, with a radius equal to *d-e* in the true length diagram. Now with *3-6* in the side elevation as radius and *3* in the cheek

SAL-MO ASBESTOS PRODUCTS

THE SAL-MO reputation for quality asbestos products was gained only through years of satisfactory service. Your jobber has confidence in SAL-MO quality and is in position to quickly furnish you with the right materials for insulating all types of Warm Air Heating and Air Conditioning Equipment, Furnace Cements, Asbestos Coverings for all kinds of Piping—Steam, Hot and Cold Water, and Flexible Asbestos Jackets for Hot Water Tanks. Also Duct insulation for air conditioning, etc.

Your nearest JOBBER is your best source of supply for SAL-MO Warm Air Heating Insulations.

SALL MOUNTAIN COMPANY
176 West Adams Street Chicago, Illinois

pattern as center, describe a short arc near *6* and intersect it by an arc struck from *7* as center with a radius equal to 7^x-6^x in the heel pattern.

Draw lines in the cheek pattern from *2* to *3* to *7* to *6* to *3*. Take a reproduction of *3-4-5-6* in side elevation and place it as shown by similar numbers in the cheek pattern, being careful to set the line *3-6* of the reproduction directly over the line *3-6* in the cheek pattern. Then will *1-2-3-4-5-6-7-8* be the desired pattern for both sides of the cheek. Slight bends must be made in the cheek patterns with inclinations as shown by the shaded section *l-m* and *n*. It may not be out of place to say that the shaded part of the sections show the *inside*. In other words the line *2-7* is bent slightly inward while the lines *7-3* and *3-6* are bent slightly outward.

◆

Cooling A Bowling Alley

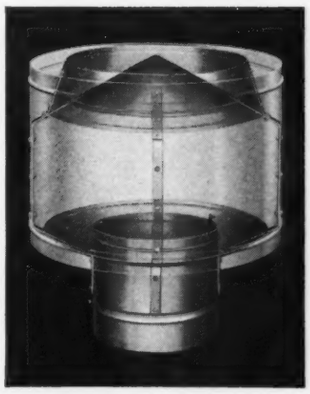
(*Continued from page 47*)

used was in operation; had ten speeds (3,000 cfm on highest speed); and was removed and placed as shown in the elevation.

The fan exhaust operates independent of the cooling system, but the gravity exhaust is connected to the fan housing as shown in the plan and serves as the duct for recirculated air to the fan.

The sheet metal work was handled by General Sheet Metal Co., Minneapolis.

"Stream-Flo"



An ALCO VENTILATOR

Uses natural forces of wind, temperature and stack action to develop maximum exhaust in stationary ventilator. Extra diameter and height of primary suction band produces strong wind effect and provides more than ample discharge area: performance is further enhanced by inner suction band. No snow or rain can enter; no updrafts enter the head. An extraordinarily efficient unit, available in wide range of sizes. Please write for capacity tables. Also available with power fan.

The Allen Corporation, Ventilator Specialists, manufacture a long line of ventilating equipment, and will gladly consult with you about problems which you are called upon to meet.

The ALLEN Corporation

Ventilation Specialists

9752 ERWIN AVE., DETROIT, MICHIGAN

"Two Years Before He Got the Order!"

"The Williamson Heater Company:

"I had an inquiry for a furnace from a family to whom we were recommended. It looked like a PUSHOVER sale; the papers were made out and signed by the good wife. I called to pick up the papers. I ran into a storm. The old gent was a Union official. There are no union furnace men in Rochester, ourselves included, so that was the end of that.

"This past fall, knowing they had not purchased a furnace, I dropped in COLD TURKEY, caught the OLD GENT just right, and sold him a 'Tripl-ife' for $94 higher than my quotations on a Standard furnace 2 years previous."

Signed—XYZ . . . New York.

Complete information; name, address of writer of above letter furnished on request. Phone, wire or write The Williamson Heater Company.

FREE: Complete, easily understood short method for figuring air conditioning job. You can complete your figures, price job in one hour flat. Write Dept. No. 2. The Williamson Heater Company, Cincinnati, Ohio.

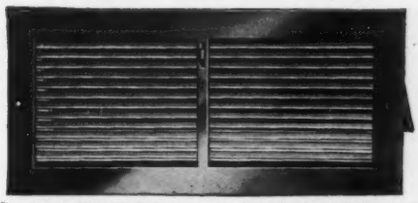
Complete Line . . . Quick Service

WILLIAMSON WARM AIR FURNACES

This is our Fifty-first year

NEW AIR CONDITIONING REGISTERS

The New Rock Island line of Air Conditioning Registers now shown in complete new catalogue just off the press.



No. 822 Wall Register---Horizontal Vanes

The New Rock Island Air-Vane Registers are of bar type fabricated construction—Attractive Appearance—Rigid Construction—Vertical or Horizontal Vanes—Simple, secure adjustment.

Dealers Net Estimating Book, a time and money saver, gives full particulars, prices, etc.

Mail Coupon Today

ROCK ISLAND REGISTER CO.
Rock Island, Ill.

Gentlemen:
Please mail me a copy of your dealer's net estimating book.

Name .....

Street Address .....

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• INAUGURATING THE FURNACE REPAIR SEASON

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WISE BIRDS take advantage of the warm months by repairing old or installing new heating equipment.

WISE SOURCES of supply, anticipating this demand, will be ready with a complete stock of . . .
LACLEDE FURNACE CEMENT

Because **LACLEDE FURNACE CEMENT**
DRIES FASTER
SETS STRONGER
LASTS LONGER

FREE You are invited to examine and test Laclede Furnace Cement and Firezist. You be the judge!

New! **LACLEDE FIREZIST** hand moldable plastic furnace lining.

LACLEDE-CHRISTY

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• BARBER

Gas Pressure REGULATORS

for Reliability!

Certified by A. G. A. Testing Laboratory. Write for Catalog and prices on Barber Conversion Burners, Appliance Burners, and Regulators.

THE BARBER GAS BURNER CO.
3702-4 Superior Avenue
CLEVELAND OHIO

Sizes 1/4" up

THE LITTLE BLACKSMITH

3 in 1 Combination Punch, Shear and Bender

Machine No.	CAPACITY		
	Punch	Shear	Bend
O. A.	1/4" in 3/16"	3/16" x 1 1/4"	1/8" x 1 1/4"
1	5/16" in 1/4"	1/4" x 2"	1/4" x 2"
2	3/8" in 3/8"	3/8" x 3"	3/8" x 3"

Write for catalogue on Punches, Angle Shears, Notchers and Deep Throat Presses.

J. F. KIDDER MFG. CO., INC. • 400 Colchester Ave. BURLINGTON, VT.

Michigan Convention

(*Continued from page* 92)

for re-roofing work was discussed in detail—some contractors believing that such a set of specifications was impracticable; other contractors have tried out such an idea and have found it distinctly advantageous. Contractors using the re-roofing specification claim to be able to sell the prospect a substantial, a well-designed and usually a complete re-roofing job in preference to the patching which is so customary in re-roofing. This idea seemingly has merit and will be studied during the next few months.

The roofers' session went on record as proposing that only fifteen and thirty-pound felt be manufactured and sold. All other felts used in roofing shall be discontinued. The intent of this resolution is to eliminate the practice of contractors cutting prices by reducing the weight of the felt used. The session also discussed the possibilities of a flashing specification which is now incorporated in most roofing manufacturers' handbooks, but which do not agree. The roofers present at the meeting elected P. O. Wierenga, Chairman, and Adam Martin, secretary, of a roofers' committee, which, it is hoped, will eventually become a separate organization within the State association just as has become the heating contractors' group.

Bookkeeping and Cost Keeping

A very interesting discussion on overhead and methods of cost accounting and bookkeeping was presented by Edwin A. Scott of Sheet Metal Worker. Mr. Scott explained that the system he presented began as Fred U. Ritter's bookkeeping system used by the Philadelphia association for Philadelphia contractors. Mr. Scott declared that any set of standard costs is impracticable because material costs differ, labor wage rates differ; efficiency of mechanics varies widely; management may be efficient in one case and inefficient in another; and the type of equipment used also effects costs. In place of a standard cost system, the speaker said that each contractor must establish his own cost based upon his own previous records.

The biggest difference in cost occurs in overhead and whether overhead be applied on productive labor or on both material and labor, the method of applying overhead is not as important as the complete recording of all items which enter into overhead costs. The key to any cost system is the job record sheet which must be filled in completely for each job and filed as a record. A weekly time proof sheet adds up time sheets and checks actual payroll against labor amounts paid out. According to records, 85 percent of all overhead costs are made up of the four items—non-productive labor, automobile expense, rent, and sales and advertising costs.

America and World Problems

An interesting general address was presented by Dr. Russel H. Seibert of Western States Teacher's College, who discussed world trends in general. Dr. Seibert said that many people wondered if the present war is not like the last war and if so we should stay out, but people forget that whereas the former kaiser recognized many social obligations the present German regime is completely reckless so far as social obligations are concerned. In 1914 Germany was moving

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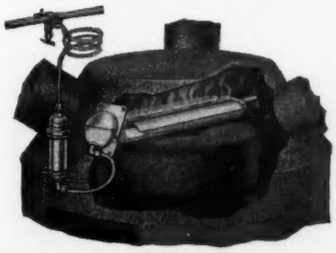

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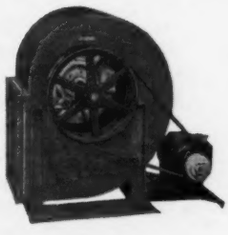

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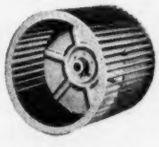

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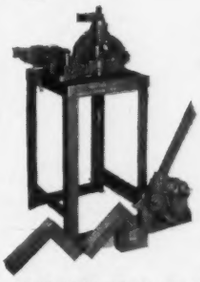

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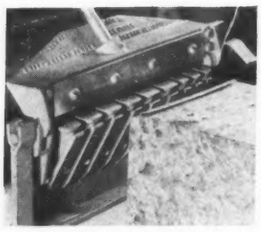

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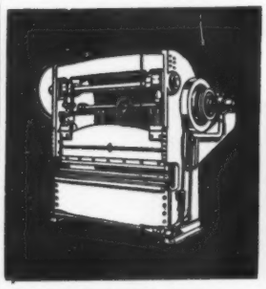

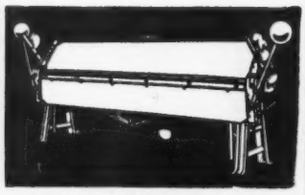

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slowly toward a popular government and political party such as we know; today, the movement is exactly in the opposite direction.

American social thought and German social thought differ radically on several points, such as

1—Freedom of religion and personal liberty with the individual all important and the state subservient to the individual is America's way of life; in Germany, the individual is not important and the State is all important.

2—All individuals of whatever race or creed are considered equal socially and the economic opportunities extended in America apply alike to all, whereas in Germany one precept is toward a so-called pure Aryan race and other nationalities are looked down upon.

3—America believes that all nationalities and all countries should be free to govern themselves as they see fit, whereas Germany believes that Germany should rule the world.

Keeping the pot boiling everywhere through differences of opinion between groups in any country; jumping the price for bargaining instead of dropping the price as is usual in national trading; are the two methods Germany has used to date to stir up unrest and obtain its ends. Dr. Seibert pointed out that if Germany wins it means a lower standard of living for all other countries, including America, and that history shows dictatorship has always come to power on the heels of a weak government. In the opinion of the speaker, perhaps the giving up of some personal liberties is essential to winning a victory. Helping Great Britain half-heartedly will be disasterous, and full aid is desirable. The speaker pointed out that these were his own personal opinions.

Frank Ederle Lauds Association

Frank Ederle, for many years secretary of the State association, said Michigan has produced some of the countries' best known and active associations and from the activities of Michigan's various associations, other associations have taken their aims and methods. Mr. Ederle asked contractors to remember that any industry, no matter what its field may be, is much larger and much more important than any one individual of that association or any man in that industry, and if contractors will remember this, many of the petty, jealous problems will fade out and the real value of an association become evident.

The association also heard a brief address on the Michigan State Highway system by Mr. Stout of the Highway Department, and a discussion of Michigan's intangible tax law by E. E. Slye. Since this Michigan intangible tax law applies only to Michigan contractors, we are not attempting to report the law. Sufficient it be to say that the law intends to obtain finances through taxation placed upon assets which are not tangible like property, direct income which is reported, personal property which is evident, but upon assets which are not taxed by customary tax methods.

Entertainment played a rather large part in the annual convention. The Kalamazoo association tendered a banquet on the second night; the travellers auxiliary tendered a banquet on the final evening. At both banquets an elaborate floor show was presented with entertainers from Detroit. The travelers auxiliary also held their annual business meeting and elected new officers. The auxiliary went on record as desirous of extending the membership of the contractors'

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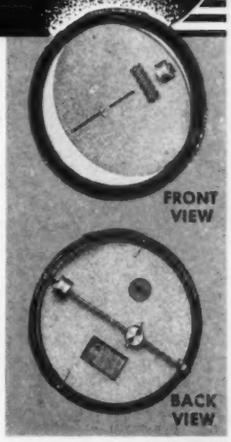

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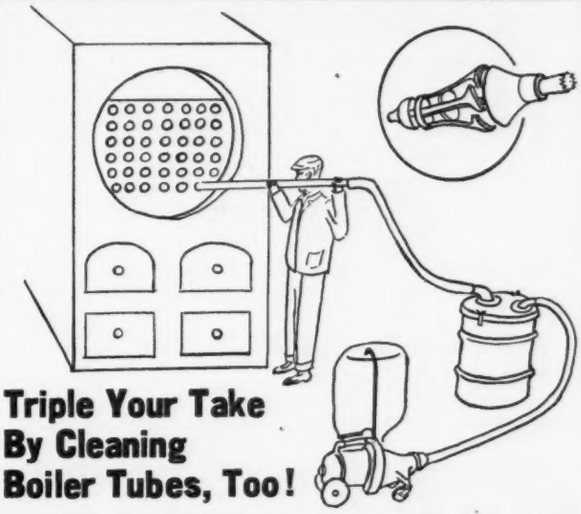

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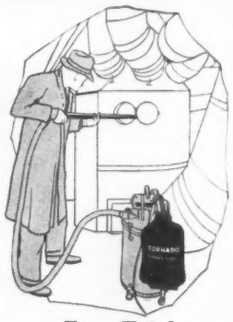

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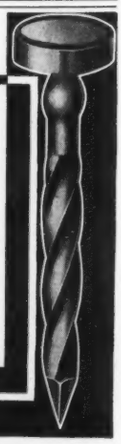

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association and doing all possible to promote the contractors' association. Next year's meeting will be held in Detroit.

Bowlers popped up at the convention, all claiming to be good and as a result two teams were organized. Detroit formed a team of Bud Ruh, Ray Zick, Wes Miller, Blake Wright, Neil Goodbread (Fred Bishop non-playing captain) and challenged a Kalamazoo team of W. Rockafield, Glen Rynbrand, Wm. Metzger, Low Tassell, Marl Alman. The result—First game: Detroit 841, Kalamazoo 844; Second game: Detroit 809, Kalabazoo 797; Third game: Detroit 752, Kalamazoo 906. Total: Detroit 2402, Kalamazoo 2547.

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◆

Material Collecting System in a Furniture Factory

(*Continued from page 72*)

are not quite as ideal as hoped for.

Each twin-fan discharges into a vertical riser which goes straight up to the second floor and out of the building into the separator as one photograph shows.

As stated previously, most of the pipe work was new and was sized according to the outlets on the machine. Pipe sections and fittings were fabricated in the Rockford Industries shop—using both new and old material where old sections could be dismantled immediately. Runs of pipe were laid out across the floor to get measurements, final fitting taking up small variations in measurement. The pipe is all slip jointed, riveted and soldered to obtain a tight system since air volumes are large, distances traveled long and materials from several machines quite heavy.

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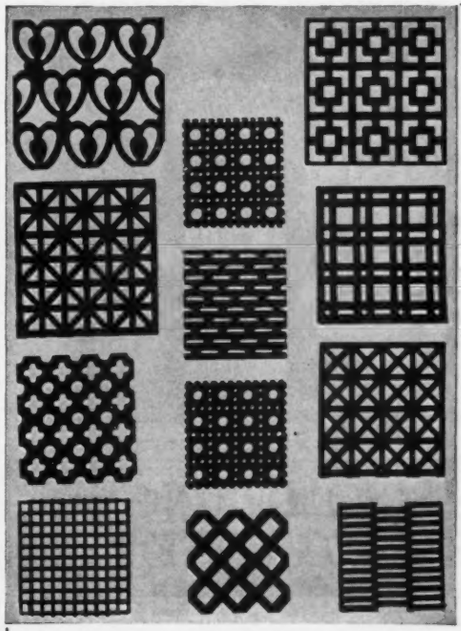

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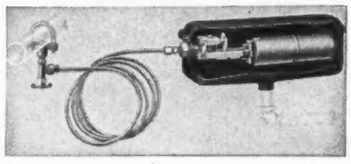
Tomorrow's humidifier valve .... today!



HERE'S the end of your humidifying troubles —a float valve with a new snap action that prevents plugging up or sticking open. Snaps open wide when water drops ¼-inch in pan; snaps to leak-tight closure against any water pressure when water level is restored. Has greater capacity—withstands high temperature—doesn't wire draw or corrode. Write for engineering data proving its superiority.

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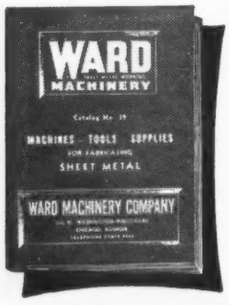

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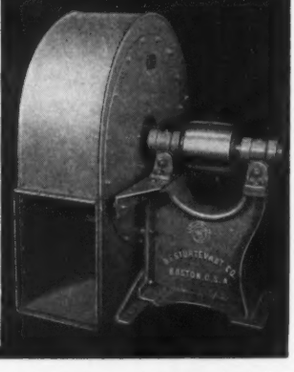

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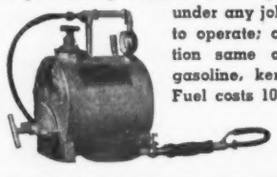

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Air Avidity

(Continued from page 66)

midity is raised to a proper (not excessive) point. If you suffer from asthma, try this. It gives prompt relief in certain forms of asthma.

If you have a head cold, humidify the air. It brings about healthful breathing conditions that facilitate recovery. There is more sneezing in super dry air. A sneeze is an effort of Nature to re-moisten the breathing passages and possibly ward off an incipient head cold. As humidification tends toward a healthful condition of the breathing passages, it tends to reduce the number of head colds and this explains the common experience of many—less colds.

There are practical limits to how much water vapor the air in homes can carry. These limits must be considered in humidification. They will be discussed in a succeeding article.

◆

Fan Manufacturers Elect Officers

The National Association of Fan Manufacturers, at its annual meeting held in Detroit on February 20, 1941, elected Edgar F. Wendt, president; E. Szekely, vice-president; and L. O. Monroe, secretary-treasurer for the ensuing year.

Mr. Wendt is president of Buffalo Forge Company, Buffalo, New York, and Mr. Szekely is vice-president and general manager of Bayley Blower Company, Milwaukee, Wisconsin.

L. O. Monroe, Secy.-Treas.

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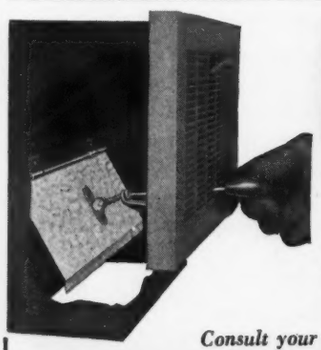
Liked by both the TRADE and by the GOVERNMENT Authorities

It will pay you to investigate this new Register.

REGISTER & GRILLE MANUFACTURING COMPANY., Inc.
70 Berry Street, Brooklyn, N. Y.



MAYN AIR DAMPER
(Patent Pending)

YOUR PROTECTION

against high cost balancing and expensive service calls is assured when you use the MAYN AIR DAMPER. Tamper-proof, positive, quick to install.

Consult your jobber or write us direct.

CONTROLAIR INC.
607 West Avenue ELYRIA, OHIO

Ventilation Now— Conditioning Added Later

(*Continued from page* 55)

comfort cooling. Fan housings should be large enough to take cooling coils, fans should be selected with a view to adequate air capacity at low velocities, provisions in ducts should be made for possible substitution of special grilles and concentric-ring diffusers plus placing the system under automatic control.

The proposal's figure should be sufficiently high to cover easy addition of mechanical cooling rather than merely covering plain ventilation. The slight extra price is not enough to lose contracts, while owners' interests are thus well served. Offering the proposal and engineering design for complete air conditioning, but permiting prospects to order initial parts of the complete installation over a period not to exceed 6 months without price revision is a selling method which protects customers as well as dealers, and is sane selling that secures maximum results, in the belief of County Refrigeration Service.

◆

MacGuffie Manager Welding G-E Sales

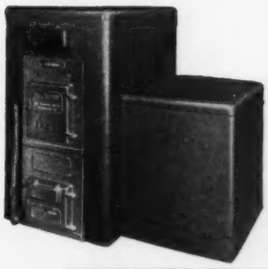
C. I. MacGuffie has been appointed manager sales, electric welding section of the General Electric Company, Schenectady, according to an announcement by J. E. N. Hume, commercial vice president of the company. Mr. MacGuffie succeeds L. D. Meeker.

RYERSON CERTIFIED STEELS

LARGE STOCKS...IMMEDIATE SHIPMENT

Principal products include—Alloy Steels, Tool Steels, Stainless Steel, Hot Rolled Bars, Hoops and Bands, Beams and Heavy Structurals, Channels, Angles, Tees and Zees, Plates, Sheets, Cold Finished Shafting and Screw Stock, Strip Steel, Flat Wire, Boiler Tubes, Mechanical Tubing, Rivets, Bolts, etc. Write for Stock List. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

PEERLESS Has The Units That Make Profits For Dealers . . .



Don't lose sales because you haven't the right size and price of unit to sell. Peerless dealers have everything from lowest priced cast iron and steel furnaces to completely automatic conditioners, in all sizes and priced right for quick sales. Liberal discount to dealers. Get literature and proposition NOW, and prepare for your biggest and most successful year.

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GRAND RAPIDS FURNACE CLEANERS

PUT OUT TEN YEARS AGO ARE STILL GIVING TROUBLE FREE DAILY SERVICE.

Free Trial
Convenient Terms

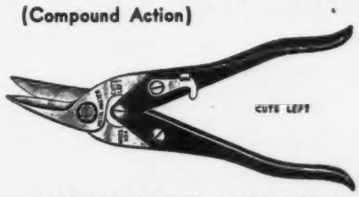
Write for Details

DOYLE VACUUM CLEANER CO.

227 STEVENS ST., S. W. GRAND RAPIDS, MICH.

WISS "METAL-MASTER" SNIPS

(Compound Action)



"TWICE THE WORK WITH HALF THE EFFORT"

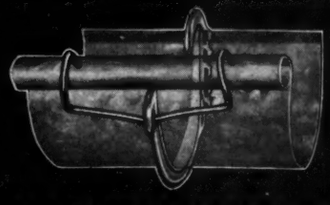
TWO MATCHED PATTERNS M1 (Cuts Left) M2 (Cuts Right) Cut circles, squares and any irregular patterns on Stainless, Dural and Monel Metals with the greatest of ease. Jaws of wear-resisting Manganese Molybdenum Steel. Handles hot-pressed from tough Chrome Vanadium Steel. Nickel steel bolts and nuts to Government specifications. All parts interchangeable. Detachable rubber handle grips at slight extra cost.

J. WISS & SONS CO.

ESTABLISHED 1848 NEWARK, N. J.

"BB" QUALITY

Order from your jobber



Saves time and labor

"BB" SPRING CIRCLE CLIP

Furnished only with "BB" Circles at no extra charge over old style straps.

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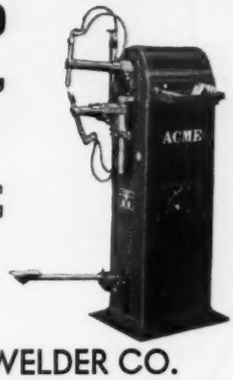
SPOT WELD

WITH AN

ACME "Hot Spot" WELDER



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AMERICAN ARTISAN Service Section

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Salts, Paste, Liquid, Oil

Tell us on your letterhead. We will send your choice.

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Buy Allen Fluxes and Soders at your Jobbers

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ALUMI—SODER

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Comes in bar and wire form—no flux needed

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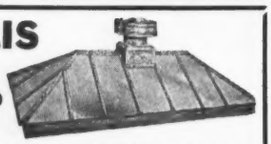

SKYLIGHT and VENTILATOR

Constructed of quality materials to give greatest amount of light and maximum strength of construction. Ventilator is absolutely water tight. Pivoted metal dampers will be included with ventilators, so hung that normally they will be closed. Skylights can be constructed to any size required.

Write for our Skylight Catalog No. 10

WILLIS STEEL CORPORATION

Galesburg, Illinois

QUICK DELIVERY!

Shears: Power: Chgo. Steel, Bertsch, Niagara 6′. 18 ga. 10′⅛″; United Eng. 126″, 7 ga., m.d.; 10′¾″, 18″ gap; 62″⅛″, 5′10 ga.; 10′18 ga.; Streine 10′10 ga.; 12′14 ga.; Bertsch 10′14 ga.; Bertsch 5′10 ga., 8′14 ga.; 48 10 ga.; 8′16 ga. Pexto; 10′10 ga.; 16′x¾″ Toledo, 15″ gap.

Ring and Circle: No. 388-A Toledo, ⅜″ cap.; No. 15 Nia.

Rotary: No. 25 Quickwork, 7/32″ cap.; No. 34-M Marshalltown, ⅜″ cap.

Throatless: No. 2 Ryerson, 10 ga.; No. 10P Marshalltown, 10 ga.

Press Brake, 30′ Birdsboro: Capacity approximately ⅝″ plate; self-contained with controls, upper and lower die holders and several extra dies. Estimated weight 200,000 lbs.

20′ & 30′ Alliance Rolls: Diameter of top roll 26″; lower rolls 20″ each; capacity according to radius from 1″ to 1½″; drop end housing, hydraulically controlled; Motor Drive.

"Send for our Latest Catalog 404"

INTERSTATE MACHINERY CO., INC. 1433 Pershing Rd., Chicago

The Electric City Gutter Former

MAKE YOUR OWN GUTTER AS YOU WANT IT

Easily and quickly operated. Soon pays for itself.

REPLACEMENTS

Beading Rods, Handles, Rolls, etc., quickly furnished.

STERLING BEADER

A simple and inexpensive machine for forming round bead.

F. L. ROBERTSON

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THE FAIRMONT...

Welcomes You to San Francisco

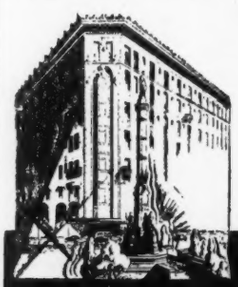
World-famous Fairmont Hotel on the top of San Francisco's highest hill, welcomes the members of the Pacific Heating and Air Conditioning convention, June 16th to 23rd. Here are all the keys to the city. Just a few minutes from theaters and shopping centers, living at the Fairmont reaches a high mark in comfort, and a high level of gaiety in the famous Circus Lounge, Venetian Dining Room, and indoor swimming pool.

Rates from $4.00 per day

Garage in the Building

George D. Smith, General Manager

Traveling Men Who Cover Buffalo Prefer This Well Located Hotel



Because it is right in the heart of the business and shopping district—because there is always a good room available—because the food is excellent.

RATES

Single ..... $2.50 up

Double ..... 4.00 up

Special rates for 4 or more.

Write for Folder 1-10.

K. A. KELLY MANAGER

Hotel LAFAYETTE BUFFALO, N.Y.

Air Conditioning

—What happens between two rooms, one having a six minute air change, and the adjoining room a twelve minute air change?

—Can you install a thermostat control system properly?

The answers to these and hundreds of other mechanical questions about air conditioning are appearing in the monthly *Air Conditioning Section* of AMERICAN ARTISAN.

If you do not now get the ARTISAN, send us $2 and we will enter your subscription for a full year—12 consecutive issues. Your subscription will yield a rich harvest of money making ideas and solutions to many mechanical problems connected with warm air heating and sheet metal contracting.

AMERICAN ARTISAN

6 North Michigan Ave. Chicago, Ill.

Classified

AMERICAN ARTISAN Service Section

HELP WANTED

A rare opportunity—to head up an outstanding engineering department—for one of the large, nationally known equipment manufacturers in the heating and winter air-conditioning field. The man we require should have the poise, background, and executive ability to direct a staff of able engineers, as well as to maintain liaison between engineering and marketing and to command respect in external relations with the industry. Naturally, we expect that the successful applicant will be well-versed in the design of heating equipment, and that he is now engaged in the industry. A sound engineering background is essential—with proved ability to formulate problems, initiate projects, and follow them through to a successful conclusion. Please give full details in first letter including snapshot. This is imperative prior to personal interview. Our own personnel knows of this advertisement. Key 533, American Artisan, 6 N. Michigan, Chicago.

WANTED—Advertising Manager with knowledge of warm air furnaces, Air Conditioning, Oil Burners, Stokers; man capable of handling all advertising copy and sales correspondence. Give age, salary expected and references in first letter. Position is open at this time with midwestern furnace manufacturer. Key 527, American Artisan, 6 N. Michigan, Chicago.

FOR SALE

Old established furnace and sheet metal business located in leading Pacific Northwest city. Doing large volume of business. Completely equipped shop with modern tools. A real opportunity to make money. Address Key No. 534, American Artisan, 6 N. Michigan Ave., Chicago, Ill.

For Sale—One Swift Cleaner, World's Largest Electric Suction Furnace Cleaner, used only one month in perfect condition. Write Charles Rambo, Box No. 21, Columbus, Ga.

WANTED

Wanted: Used furnace vacuum cleaner. Give particulars and price. Address Ludwig Sheet Metal Shop, Ottawa, Illinois.

BOOKS

AIR CONDITIONING FOR COMFORT

Third Edition—285 Pages—$2.00

An exhaustive and clear treatment of the subject of air conditioning. Covers psychrometry, humidifying, dehumidifying, mechanical refrigeration, heat transmission, air volumes, infiltration, air distribution, water circulation, etc. An invaluable reference book that belongs in the hands of everyone interested in or doing air conditioning work. Order from Keeney Publishing Co., 6 North Michigan Ave., Chicago, Ill.

JOHNSON'S
NEW HANDY MANUAL
on
HEATING, VENTILATING
MECHANICAL REFRIGERATION
and
AIR CONDITIONING

432 pages of practical, condensed information, tables, rules and diagrams. Price $1.00—Remit with order to

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6 N. Michigan Ave., Chicago, Ill.

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Sheet Metal Fabrication Machinery
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Spot Welders—Whitney Tools
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"Always Ready to Serve You"

CENTRAL-WEST MACHINERY CO.

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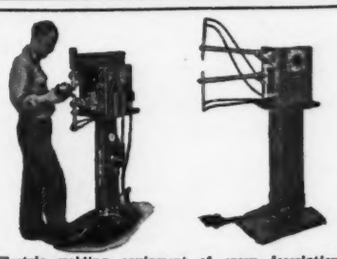
Tel. Haymarket 8361 335 S. Western Ave.
Chicago, Ill.

BLOWERS — FANS — EXHAUSTERS

THOROUGHLY REBUILT, for perfect performance. All types; all standard makes. All sizes including the big ones. Hundreds in stock, meeting all requirements. Attractive prices. Fully guaranteed. Expert engineering counsel. GENERAL BLOWER CO., Engineers, 403 North Peoria Street, Chicago, Illinois.



Electric welding equipment of every description to weld from a watch case to a door. Special or standard SPOT WELDERS from ¼ to 500 K.V.A. A.C. Arc Welders from 100 to 400 Amps. We invite contract Spot Welding in large or small quantities.

EISLER ENGINEERING COMPANY
CHAS. EISLER, PRES.
751 S. 13th St. (Near Avon Ave.) Newark, N. J.

Trademark
YAGER'S Soldering Salts — Paste
Reg.

Two standard fluxes for all soft soldering. Safe, quick, certain. Buy them at your jobbers or write us if he cannot supply you.

½ lb., 1 lb., 5 lb. cans; 2 oz., 6 oz., 12 oz.

ALEX. R. BENSON CO., INC., HUDSON, N. Y.

CUSTOM FABRICATION
OF ALL ALLOYS
STAINLESS-MONEL-COPPER, ETC.

Custom fabrication of all alloys with satisfaction guaranteed. Send blueprints for prices and delivery. Years of experience guarantee responsible and accurate work. TERMS CASH WITH ORDER. Write today for further information.

RIESTER & THESMACHER COMPANY
SHEET METAL PRODUCTS
1526 W. 25th St., Cleveland, O.

THIS NEW BARTLETT No. 19 Compound Lever Shear cuts 14 gauge easily. Weighs only 3½ lbs. 20 in. overall. 2¼ in cut.

Other Bartlett drop forged compound lever snips are made in 7-8-10-12-14 in. sizes. Write for descriptive catalog page and folder on Compound Lever Snips and Bench Shears.

BARTLETT MFG. CO.
3035 E. Grand Blvd.
Detroit Mich.

AIR-A-WAY
REVOLVING VENTILATORS

Exceptional Air Removal
•
Simple, Sturdy Construction
•
Low Selling Price
•
Completely Open-Throat
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Write Today for Catalog

Pat. 2193877
NO Down Draft
Hot Air Pockets
Water Leaks

American Metal Products Co.
Sylvania Sta., P. O. Box 66 Ft. Worth, Texas

Save Money, Time and Muscle

Drill Concrete with the "Do-All" Combination Electric Hammer and Drill. Set expansion bolts 10 to 20 times faster than with hand tools. Drills concrete, brick, stone, metal, wood. Easy to maintain. Weighs 15 lbs. Drills to 1⅝" in concrete. 2400 blows per min. Bulletin 400. Phone Austin 9866.

WODACK ELECTRIC TOOL CORPORATION
4644 W. Huron St., Chicago, Ill.

Better for Every Spraying Purpose
MARLEY SPRAY NOZZLES

"Tops" for Air Washing, Humidifying, Brine Spray Lofts, etc. Marley nozzles lead all in sales and in profits to you.

★ Finer, more uniform spray.
★ Effective operation at Low Pressures saves on pumping cost.
★ No internal parts to clog or wear. ★ Longer life, superior materials and workmanship.

MARLEY CO. Write for Literature Now! Kansas City, Kansas

13c RIBBED WIRE GLASS ¼"
13c per sq. ft.—Plus Boxing
f.o.b. our warehouse
STOCK SHEETS—CASE LOTS
Reasonable freight rates to all parts of U. S. A.
Salesmen wanted for several territories.
Cut sizes—2c per sq. ft. additional.
PROMPT SHIPMENTS—GOOD QUALITY
T. J. ATCHESON GLASS CO. 955 MAIN ST.
Buffalo, N. Y.—U. S. A.

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Index to ADVERTISERS

Acme Electric Welder Co.....137
Adams Co., The..... *
Aerofin Corp. 28
Air Controls, Inc.....120
Air Controls Products, Inc..... *
Air-Maze Corp. 122
Airmode Mfg. Co..... *
Airtemp Division, Chrysler Corp..... 27
Aldrich Co. 122
Allen Co., Inc., L. B.....138
Allen Corp. 129
American Air Filter Co., Inc..... *
American Blower Corp.....14 and 15
American Brass Co. 12
American Metal Products Co.....139
American Radiator & Standard Sanitary Corp. 16
American Rolling Mill Co., The.... 22
Apollo Metal Works.....134
Atcheson Glass Co., T. J.....139
Auer Register Co..... 3
Automatic Humidifier Co.....128
Automatic Products Co.....105

Barber Gas Burner Co., The.....130
Barber-Colman Co. 103
Bard Mfg. Co.....131
Bartlett Mfg. Co.....139
Benson Co., Inc., Alex R.....139
Berger Bros. Co.....137
Bethlehem Steel Co..... 84
Brauer Supply Co., A. G.....134
Bremil Mfg. Co.....132
Breuer Electric Mfg. Co.....134
Buffalo Forge Co..... *
Burt Mfg. Co.....117

Carnegie-Illinois Steel Corp..... 26
Central-West Machinery Co.....139
Century Electric Co..... 25
Chandler Co. 108
Cincinnati Sheet Metal & Roofing Co..124
Clarage Fan Co.....119
Cole Hot Blast Mfg. Co.....123
Commercial Shearing & Stamping Co..135
Conco Corp. 110
Controlair, Inc. 136
Crescent Tool Co..... 83
Curtis Refrigerating Machine Co..... *

Delco Products Corp..... *
Deniston Co. 134
Detroit Lubricator Co..... *
Doyle Vacuum Cleaner Co.....137
Dreis & Krump Mfg. Co.....132

Econocol Stoker Div., Cotta Transmission Corp. 107
Eisler Engineering Co.....139
Electric Vacuum Cleaner Co., Inc....123
Elgo Shutter & Mfg. Co..... *
Emerson Electric Co., The.....125

Fairmont Hotel 138
Field Draft Control Division.....126
Fitzgibbons Boiler Co., Inc..... *
Fluid-Heat Div., Anchor Post Fence Co. ..... *
Frederick Iron & Steel Co..... *
Freeman Stoker Div., Ill. Iron & Bolt Co. ..... *
Front Rank Furnace Co..... *

G & O Mfg., Co..... *
Gehl Bros. Mfg. Co.....116
General Blower Co.....139
General Controls 121
General Electric Co.....35 and 36
Gerett Corp., M. A.....135
Gillen Co., J. L.....Inside Back Cover
Grant Wilson, Inc.....111
Gray Metal Products, Inc..... *

Harrington & King Perforating Co....118
Hart Cooley Mfg. Co..... 13
Henry Furnace & Foundry Co., The .....6 and 7
Hess Warming & Ventilating Co.....120
Hotel Lafayette 138
Hotstream Heater Co.....133
Hussey & Co., C. G..... 10

Illinois Testing Lab., Inc.....132
Independent Register Co., The.....106
International Heater Co.....112
International Nickel Co., Inc..... 5
Interstate Machinery Co.....138

Johnson Co., S. T.....115
Johnson Gas Appliance Co..... *

Kidder Mfg. Co., Inc., J. F.....130
Klauer Mfg. Co.....113

Lamneck Products, Inc..... .....Inside Front Cover
Laclede-Christy Clay Products Co....130
Lau Blower Co..... *
Libert Machine Co..... *
Lincoln Electric Co..... *
Lochinvar Corp. ..... *
Lockformer Co. 37

McDonnell & Miller.....136
Maid-O'-Mist, Inc. 131
Maple City Stamping Co.....127
Marley Co., The.....139
Marsh Lumber Co., Inc..... *
Marshalltown Mfg. Co..... *
Maurey Mfg. Co.....127
May-Fiebeger Co. 116
Mercoid Corp., The.....118
Meyer & Bro. Co., F..... *
Meyer Furnace Co..... 31
Milcor Steel Co..... 68
Minneapolis-Honeywell Regulator Co. 23
Monmouth Products Co..... 8
Morency-Van Buren Div., Scovill Mfg. Co. ..... *
Morrison Steel Products, Inc.....133
Mueller Furnace Co., L. J.....33 and 102

National Super Service Co.....133
Niagara Machine & Tool Works.....115
Norge Heating & Conditioning Div., Borg-Warner Corp. 24

Osborn Co., J. M. & L. A..... 20
Owens-Corning Fiberglass Co..... 99

Pacific Gas Radiator Co.....125
Parker-Kalon Corp. .....100 and 101
Payne Furnace & Supply Co.....106
Patten Co., J. V.....126
Peerless Electric Co..... 19
Peerless Foundry Co.....137
Penn Electric Switch Co..... *
Perfex Corp. 46
Philco Radio & Television Corp..... 29
Plandaire, Inc. ..... *
Premier Division, Electric Vacuum Cleaner Co., Inc.....123
Premier Furnace Co.....135

Quincy Stove Mfg. Co.....119

Randall Graphite Products Corp.....133
Register & Grille Mfg. Co.....136
Reiner & Campbell, Inc.....136
Republic Steel Corp.....9 and 40
Research Products Corp..... 30
Riester & Thesmacher Co.....139
Robertson, F. I.....138
Rock Island Register Co.....129
Round Oak Co.....114
Ruberoid Co., The.....117
Rybolt Heater Co..... 11
Ryerson & Son, Inc., Joseph T.....137

St. Louis Furnace & Mfg. Co..... *
Sall Mountain Co.....128
Sampsel Time Control, Inc..... *
Schwitzer-Cummins Co. 131
Scovill Mfg. Co..... *
Scully Steel Products Co..... 34
Skuttle Sales Co.....113
Smith, R. E.....132
Speedway Mfg. Co..... *
Standard Stamping & Perforating Co..135
Stanley Electric Tool Div., The Stanley Works ..... *
Sturtevant Co., B. F.....136
Superior Sheet Steel Co..... *
Surface Combustion Corp..... *
Swartwout Co. 126

Thermal Engineering Associates..... *
Torrington Mfg. Co..... *
Triangle Mfg. Co.....108
Tuttle & Bailey, Inc.....109

U. S. Air Conditioning Corp.....103
U. S. Machine Corp..... *
U. S. Register Co. 17
U. S. Steel Corp..... 26
Utility Fan Corp..... 38

Viking Air Conditioning Corp.....124
Viking Mfg. Corp.....104

Wagner Electric Corp..... 39
Walker Mfg. & Sales Corp..... *
Ward Machinery Co.....136
Waterloo Register Co.....110
Weirton Steel Co..... 18
Weiss & Co., H..... *
White Mfg. Co.....128
White-Rodgers Electric Co..... .....Outside Back Cover
Whiting Corp.. ..... *
Whitney Mfg. Co., W. A.....127
Whitney Metal Tool Co.....131
Williams Oil-O-Matic Heating Corp... 21
Williamson Heater Co.....129
Willis Steel Corp.....138
Wilson, Inc., Grant.....111
Wise Furnace Co..... *
Wiss & Sons Co., J.....137
Wodack Electric Tool Corp.....139

Zink Co., John.....121

Firms represented in this issue are identified by the folio of the page on which their advertising appears. Advertising which appears in other issues is marked with an asterisk.

GILCO gives you all three . .

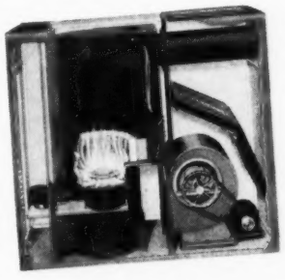
• Price • Performance • Construction

IT TAKES more than low price to profitably sell the volume market. You must have carefree performance and long life construction, too. It is just as necessary to your profits that the maintenance and operating cost of the heating system be in proper proportion to the buyer's income, as it is that the original cost of the heating system be in proper proportion to the cost of the home.

For real profits you must have all three: low price, carefree performance, long life construction. With Gilco you get all three.

GILCO VAPORIZING-POWER BURNER FURNACES

There are six models of furnaces with GILCO VAPORIZING-POWER BURNER, ranging in size from 60,000 to 100,000 BTU output register ratings. Three Winter Air-Conditioning models, two Gravity Warm Air models and one Hi-boy model. All are thoroughly matched units designed especially for the GILCO VAPORIZING-POWER BURNER. Each single part works in perfect coordination with the other.



At right: Cross-section view of Gilco's Vaporizing-Power Burner Automatic Oil Burning Furnace.

GILCO PRESSURE BURNER FURNACES

There are three GILCO furnace models designed for pressure type oil burners, ranging in size from 110,000 to 200,000 BTU output register ratings. Their construction, efficiency and appearance are unequaled, yet they are priced with the lowest. All "GILCO" equipment is finished in aluminum grey Hammerloid enamel.

GILCO OIL BURNING WATER HEATERS

The GILCO LINE of automatic oil burning water heaters meets the specifications of the most exacting buyer. Their natural draft vaporizing burner is clean, efficient and dependable on both pilot and high fire. There are four sizes: 20, 30, 40, and 50 gallon capacity. All models are listed as standard by Underwriters Laboratories for Number 2 oil.

FOR BEST *Performance* GILCO'S VAPORIZING-POWER BURNER

● Your positive assurance of troublefree performance and maximum efficiency is the GILCO VAPORIZING-POWER BURNER. It is the result of many years of constant testing and experimenting to develop the perfect oil burner to heat the smaller homes. It has been thoroughly tested in the field for the past two years and its advantages have been proven.

Its cleanliness and efficiency are unequaled. The proper amount of air and oil flow is adjusted at the factory, assuring you of maximum combustion efficiency and eliminating installation cost. It meets your every requirement for the volume market.

● LISTED AS STANDARD BY UNDERWRITERS LABORATORIES FOR NUMBER 3 OIL.

FOR COMPLETE INFORMATION AND PRICE

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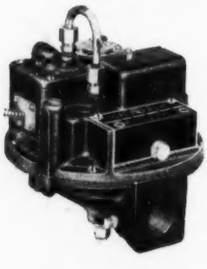

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